March 1948

THE FOUNDRY

wherever metals are cast...

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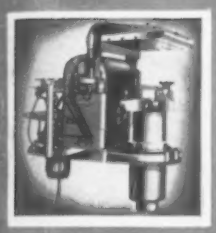
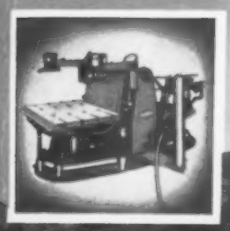
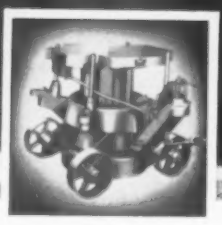
STAR PERFORMERS



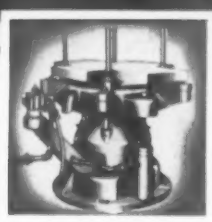
Jolt Rollover Draw, Model A



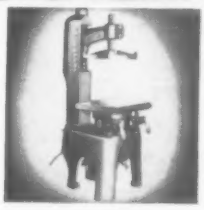
Jolt Rollover Draw, Model SA



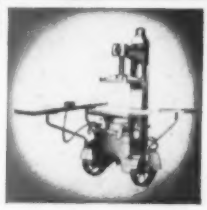
Jolt Pin Lift, Model AJS (portable)



Jolt Pin Lift, Model AJS (stationary)



Jolt Squeeze, Model 10-JX (stationary)

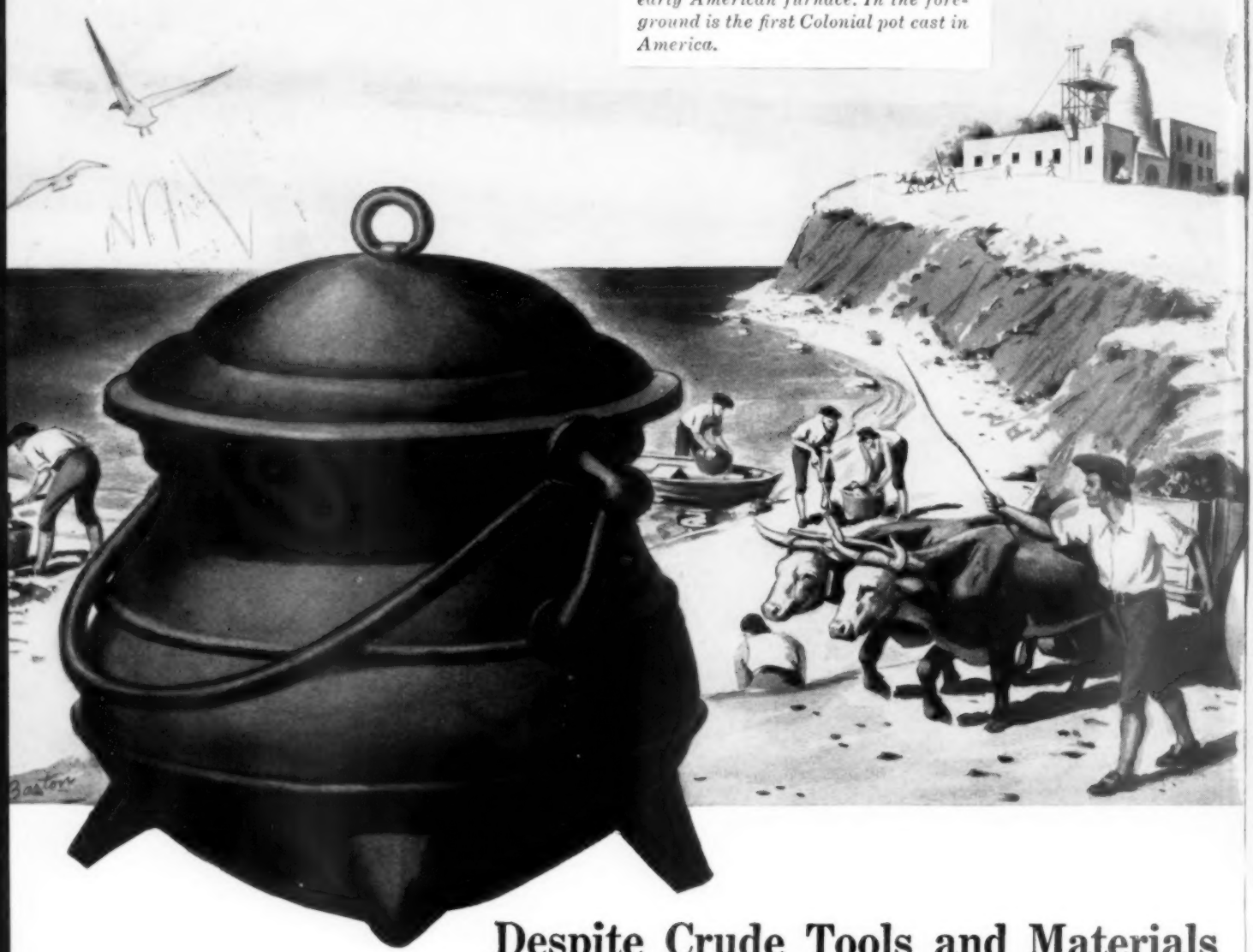


Jolt Squeeze, Model 10-JX (portable)

DAVENPORT MACHINE AND *Foundry Company*

DAVENPORT, IOWA U.S.A.

Gathering sea shells to be used in an early American furnace. In the foreground is the first Colonial pot cast in America.



Despite Crude Tools and Materials

There Was Craft in Their Castings!

PURITE is commercially pure soda ash containing over 98% sodium carbonate, fused and cast into convenient 2-lb. pigs. Its desulfurizing and refining action are traceable to the chemistry of soda ash.

Eighteenth century producers of American cast iron were handicapped by the tools and materials then available. Bog iron from the floors of ponds, lime in the form of sea shells, crude furnaces, and cruder mechanical appliances—these were the limitations. But in spite of such difficulties, the early American iron founders produced castings that showed resourcefulness and craft.

Consider the advance in foundry practice since these early days. Of course, foundries now have better materials and improved equipment – the forehearth, for instance, in which the molten iron is refined after coming from the cupola.

Modern foundries also have PURITE—an alkali prepared in two-pound pigs. PURITE reduces sulfur, deoxidizes the iron, and washes out occluded gases and entrained slag particles. The result is a clean, fluid iron with improved casting properties.

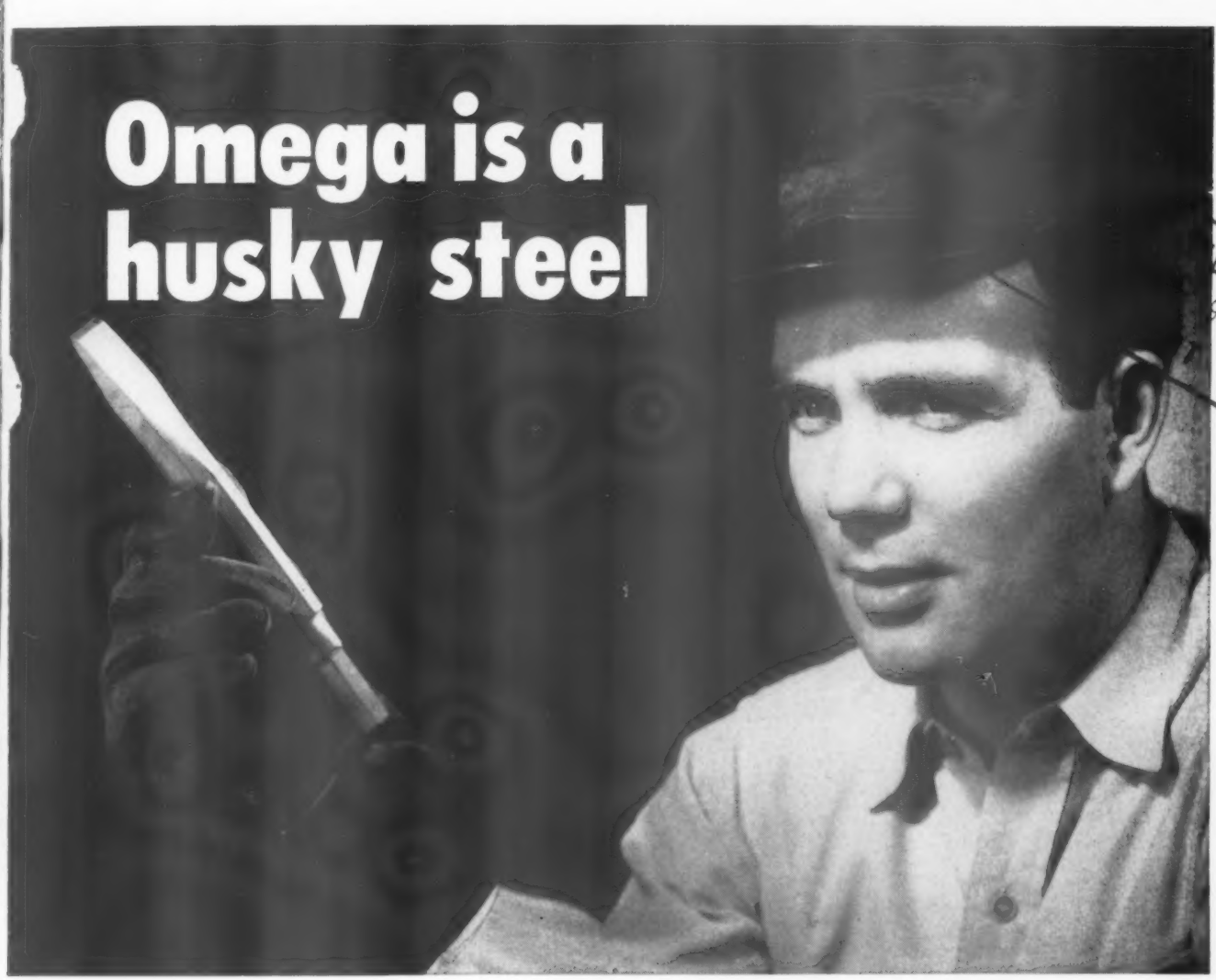
Let us send you our latest pamphlet giving details on the advantages of using PURITE. The Mathieson Alkali Works (Inc.), 60 East 42nd Street, New York 17, N. Y.

Mathieson

PURITE

Purite (Fused Soda Ash) . . . Liquid Chlorine Caustic Soda . . . Soda Ash . . . Bicarbonate of Soda . . . Ammonia, Anhydrous & Aqua Sodium Chlorite Products . . . Chlorine Dioxide HTH Products . . . Dry Ice . . . Carbonic Gas Sodium Methylate

Omega is a husky steel



BRARY
948

Here's a tool steel that thrives on cold-battering jobs. Omega keeps a sharp cutting edge and takes hard knocks in its stride. It's super-resistant to shock. That's why it's popular for applications like these:

Chipping chisels	Beading tools
Shear blades	Punches
Calking tools	Forming rolls
Rivet busters	Swaging dies

When the job calls for drastic, repeated impacts at normal temperature, Omega is your best choice. It is essentially a silico-manganese steel, combining ductility, high tensile strength, and hardness. Give it a trial—as rough as you want. You'll like the way Omega stands up.

The nearest Bethlehem district office or tool-steel distributor can give you complete details.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem Products are sold by Bethlehem Pacific Coast Steel Corporation

QUICK FACTS ABOUT OMEGA

- **Harden it in either oil or water.**
- **Easy to forge, machine, heat-treat.**
- **58-60 Rockwell C normal working hardness.**
- **In its maximum heat-treated condition, its resistance to impact, using Charpy unnotched specimen, is approximately 130 foot-pounds.**
- **Typical Analysis:**

C	Mn	Si	V	Mo
0.60	0.70	1.85	0.20	0.45

BETHLEHEM STEEL

***OMEGA*... one of Bethlehem's Fine Tool Steels**

A good performer *deserves* an encore.....

and this explains the repeat orders for Federal

GREEN BOND

BEST OF THE WYOMING BENTONITE

THE FEDERAL FOUNDRY SUPPLY COMPAN

4600 East 71st Street • Cleveland 5, Ohio

Seacoal Plant — Mines

CROWN HILL, W. VA. • CHICAGO • CHATTANOOGA, TENN. • DETROIT • MILWAUKEE • NEW YORK • ST. LOUIS • RICHMOND, VA. • UPTON, W

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Pacific Graphite Works, Oakland, Calif. • LaGrand Industrial Supply Co., Portland, Ore.
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MARCH 1948

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GOOD CORES REQUIRE

OHIO'S NEW CORE ROOM

MANIFOLD CORES

THE OHIO FOUNDRY CO.
CLEVELAND, OHIO

Top production of intricate cylinder block and head cores can't be maintained without first rate materials. Poor materials waste a core maker's time, limit his out-put, and increase the foundry's costs.

With a first rate core oil, no time is lost patching edges—each core maker can turn out more per day. Higher binding strength means fewer scrapped cores and more cores per drum. A fast, even baking oil cuts oven time and fuel costs. Thus, a first rate core oil enables the foundryman to get the full value of his men and equipment and, thereby, produce more at lower unit cost.

LINOIL

GOOD MATERIALS

FOUR-CYLINDER MOTOR BLOCK AND CORES

Core Room Foreman Julius Thomas is rightfully proud of the sound cylinder block and head cores made in Ohio's new core room. These cores are exacting and expensive. Each must be strong, gas free, readily collapsible, and absolutely dependable. From 32 years experience, Mr. Thomas considers LINOIL tops for economical and dependable cores.

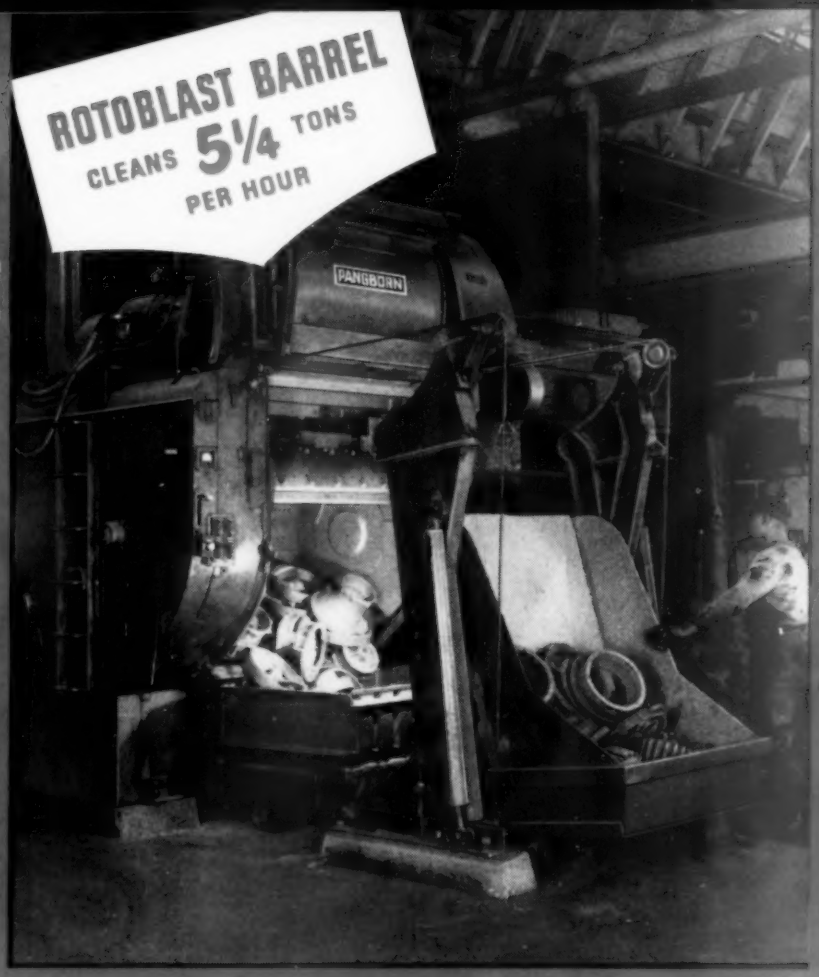
THE LINOIL — THE LOGICAL OIL

WERNER G. SMITH COMPANY

(DIVISION OF ARCHER-DANIELS-MIDLAND COMPANY)

2191 WEST 110th STREET — CLEVELAND 2, OHIO

Pangborn Blast Cleaning Team Helps OLNEY Average 1,000 Tons of Castings per Month



Pangborn

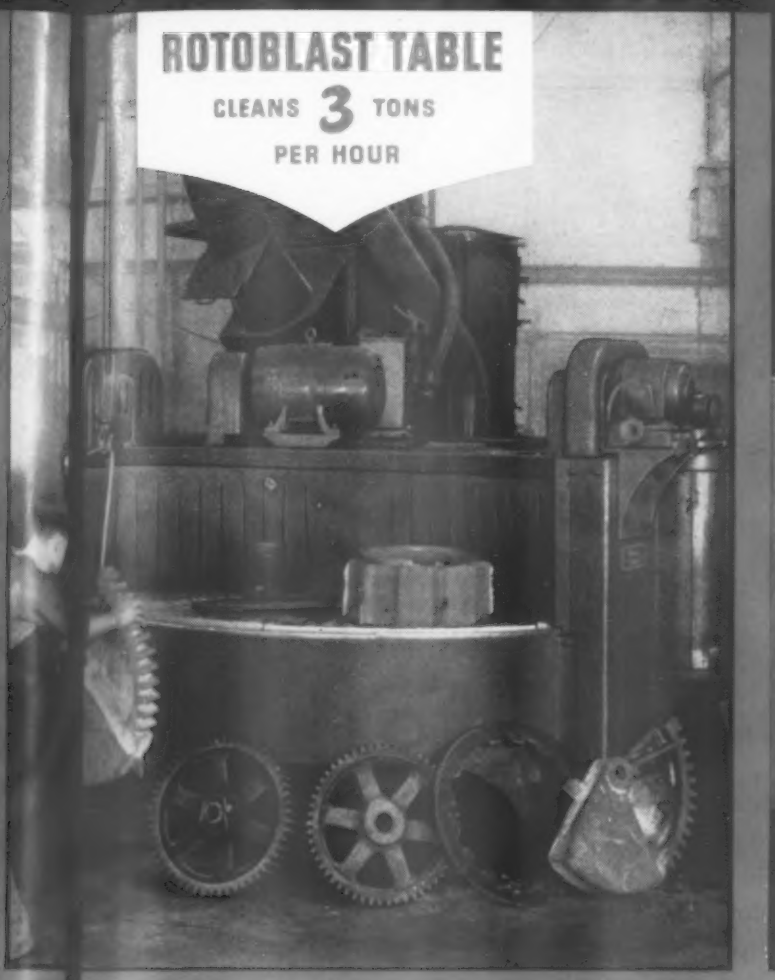
PUSHES TONNAGES UP, PULLS COSTS DOWN

PRODUCTION

COSTS

Cleaning Castings at OLNEY FOUNDRY

Division, Link Belt Company



PRODUCTION SOARED, while costs actually came down! That was the record revealed by the Olney Foundry Company, of Philadelphia, after the installation of Pangborn Blast Cleaning Equipment put Olney's cleaning operation ahead of foundry output. Thanks to the Pangborn blast cleaning team—a Rotoblast Barrel, a Rotoblast Table and an Air Blast Room—Olney's output of castings has been geared to 1,000 tons monthly. Man-hours have been saved . . . cleaning time *has been cut at least 75%* . . . machining time has been reduced. Savings like this are typical . . . faster production like this is to be expected . . . when modern Pangborn Cleaning Equipment goes to work in foundries, forge shops and metalworking plants.

Come to Pangborn for the right blast cleaning equipment to do your job *faster, better, cheaper*. Complete line of ROTOBLAST Barrels, Tables, Rooms and Special Equipment to meet every blast cleaning need. Write for Rotoblast Bulletin 213 to:

PANGBORN CORPORATION
1400 Pangborn Blvd., Hagerstown, Md.

More Than 25,000 Pangborn Machines Serving Industry

Pangborn

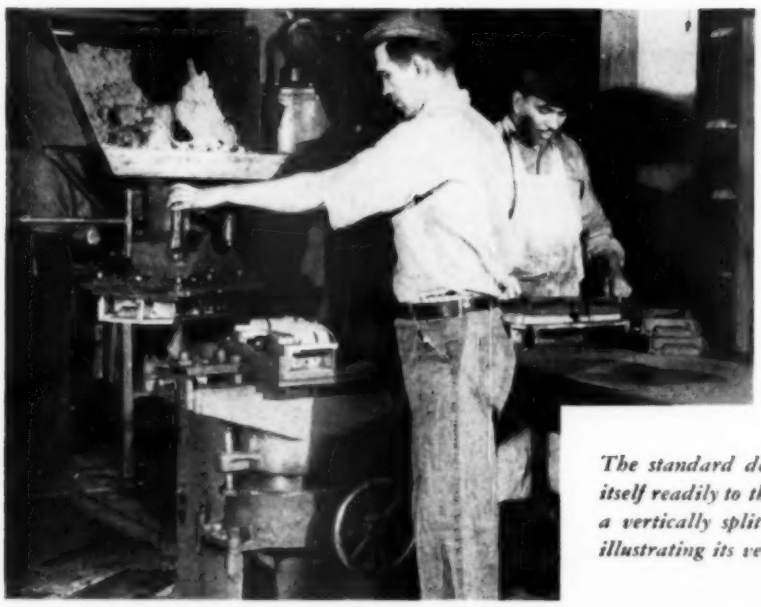
BLAST CLEANS CHEAPER with the right equipment for every job

"Champion-ize" TO BRING DOWN UNIT COSTS!

QUALITY PLUS SPEED PLUS EASY OPERATION MAKE CHAMPION MACHINES THE FAVORITES

TYPE J-S
PORTABLE JOLT SQUEEZE

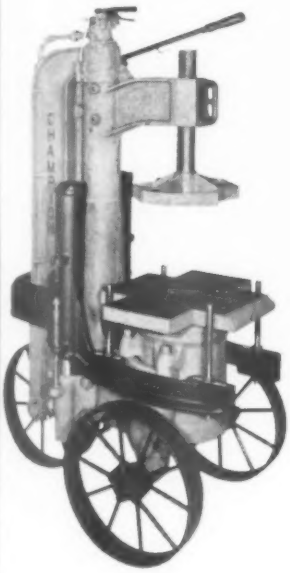
There's more to Champion performance than speed. And there's more to production efficiency than mere quantity. In leading foundries throughout the country, Champion molding machines and core blowers consistently score high on units per hour, plus greater precision, better finish, and less waste. There's something about these machines that seems to make it easier to do more work, better work and with less effort. For back of every Champion machine lies a vast experience in foundry practice, and each detail is designed with the user in mind. This extra thought expressed in a little more weight here, a little extra strength there, greater precision, greater stamina, all add up to a substantial plus value, realized by the user in terms of speed, ease, accuracy and adaptability to special conditions.



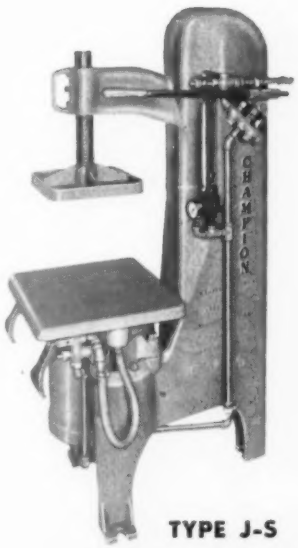
The standard design of the Champion core blower lends itself readily to the use of the attached cope, though at times a vertically split core box is used on this same machine, illustrating its versatility as a valuable feature.

TYPE J-M
POWER JOLT
HAND ROLLOVER
AND DRAW MACHINE

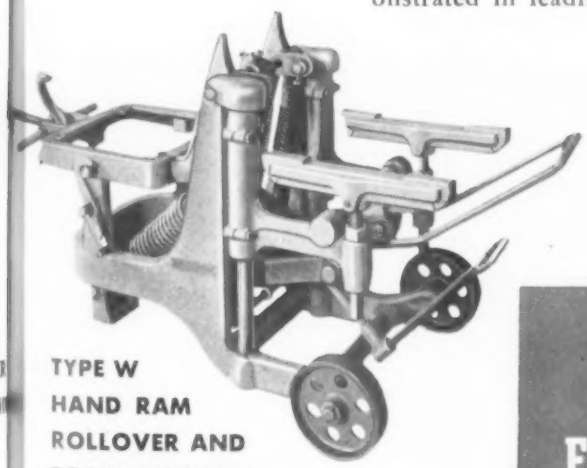
(Right and Below)
TYPE J-S-L
JOLT SQUEEZE PIN LIFT



If you have been waiting for new Champion Molding Machines, you will be glad to know production is greatly improved and deliveries are better every week. Most types are now being shipped from stock. What about looking over your whole production setup now, with a view to learning where some Champion equipment would do you the most good. By making it possible for less skilled workers to turn out more and better molds and cores, they reduce unit costs on basic operations and by raising his productivity, they broaden the opportunity for the individual worker. Lastly, they are designed and constructed for long-life and trouble-free operation, as demonstrated in leading foundries of the world, today.



TYPE J-S
STATIONARY
JOLT SQUEEZE



TYPE W
HAND RAM
ROLLOVER AND
DRAW MACHINE

WATCH FOR ANNOUNCEMENT OF
OUR NEW MODEL CORE BLOWER,
"THE CHAMPION JUNIOR"

CHAMPION
FOUNDRY AND MACHINE CO.
1318 W. 21st STREET CHICAGO 8, ILLINOIS

MOLDING MACHINES · ELECTRIC RIDDLES · CORE BLOWERS

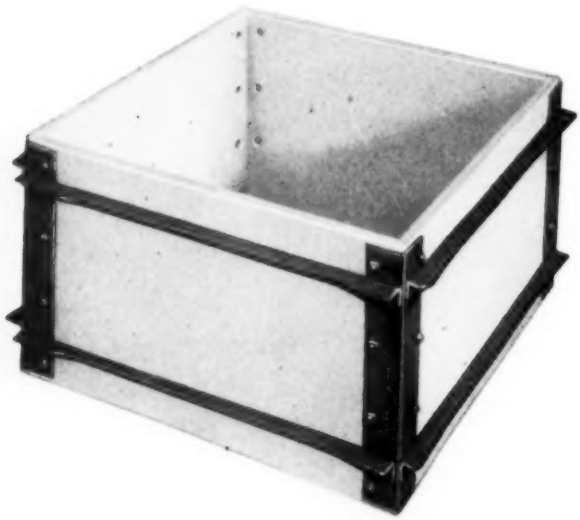
Stop Worrying About *SPILL OVERS!*

Change to

NON-BURN, NON-WARP SLIP JACKETS

On jackets up to 8" deep, *Single* Angle Irons are used—as illustrated.

On jackets over 8" deep, *Double* Angle Iron Reinforcements are used.



Molten metal can't hurt CMD Slip Jackets or cause them to stick and delay production. Made of Monasbestos one half inch thick, they won't burn. They fit smoothly and strip clean from the mold every time.

Rugged corner irons, 2"x2"x1/8" and cross reinforcing irons, 1"x 1"x1/8" are bolted and arc-welded in place to prevent warping.

. . . When ordering specify:

(1) degree of taper,

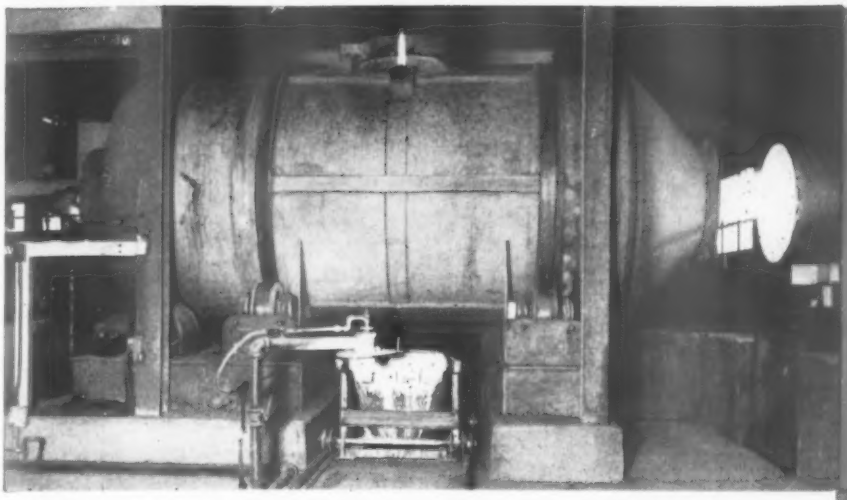
(2) size of flask at parting line and

(3) dimensions of cope and drag to fit below and above parting line.

Write Today for Descriptive Circular!

CHICAGO MANUFACTURING & DISTRIBUTING CO.

Dept. F, 1928 West 46th Street **Chicago 9, Illinois**



FROM SMELTER TO FOUNDRY

Oil-fired 20,000-pound Fisher Rotary Smelting Furnace at plant of I. Schumann and Company, well-known smelters and refiners, Cleveland, Ohio.

FISHER FURNACES

a complete line—from smelter to foundry

A complete line of smelting and melting furnaces is offered by Fisher . . . furnaces for the refiner of metals . . . furnaces for the foundry.

- Only 5 to 8 hours is required for the heating cycle in the 20,000-pound oil fired Fisher Rotary Smelting Furnace shown above compared to a 24-hour cycle in conventional reverberatory furnace. This short cycle permits heats to be run off during the working day . . . eliminates need for overtime . . . allows special orders to be run in smaller heats.
- Rotary feature allows easy control of pouring . . . no tapping as with reverberatory furnaces.

* * *

- The stationary gas-fired Fisher Melting Furnaces as shown at the right, feature convenient roll-back covers that seat perfectly. Hot surface of covers is always face downward so operator is not exposed to heat radiation. Furnaces are easily relined and all parts are quickly obtainable.
- Correct furnace atmosphere is automatically maintained by aspirator mixer and regulator. Heating is rapid and economical with low loss of metal.

Battery of stationary gas-fired Fisher Melting Furnaces in Cleveland jobbing foundry.

Fisher melting and holding furnaces are engineered for gas, oil, or electric heating. For induction heating a complete line of new Lindberg-Fisher electric induction melting and holding furnaces is available. For details call your Lindberg-Fisher representative.

Now . . . A complete line of melting and holding furnaces—gas, oil, electric

Fisher Furnaces

A DIVISION OF LINDBERG ENGINEERING CO.

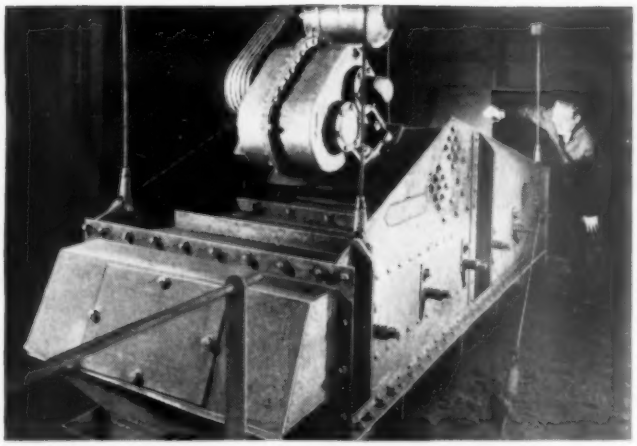
2453 WEST HUBBARD STREET • CHICAGO 12, ILLINOIS

Mechanization
MAKES THE FOUNDRY A BETTER PLACE TO WORK!

"It eliminates dirty, disagreeable work . . . should result in lower production costs," says *well-known foundry expert.* Below, see how Allis-Chalmers' "Mechanized Equipment" is helping to do that very job in U. S. foundries!

NOTE: A-C *does not* offer foundry consulting or engineering service. It *cooperates* however with such firms in recommending foundry equipment which has been proven in Allis-Chalmers' own foundries.

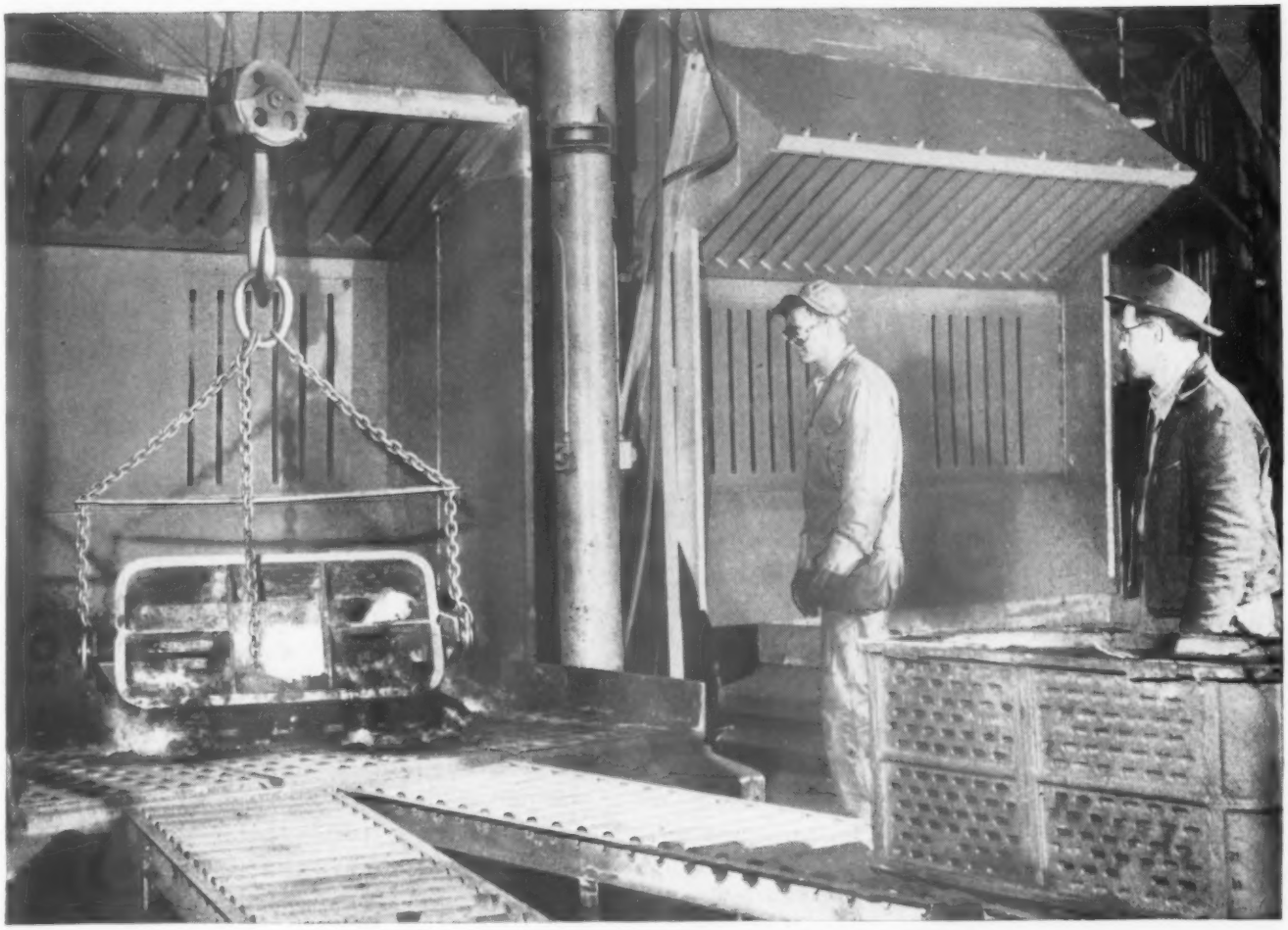
2. "OUR FOUNDRY HELP PROBLEM was licked by mechanization," says foundry operator. "Foundry shakeouts and screens have eliminated many heavy jobs . . . resulted in better control of dust and fumes, with casting output stepped up!" These statements are typical of the advantages accruing to foundries through better mechanization. A-C helps in other ways too. . . .



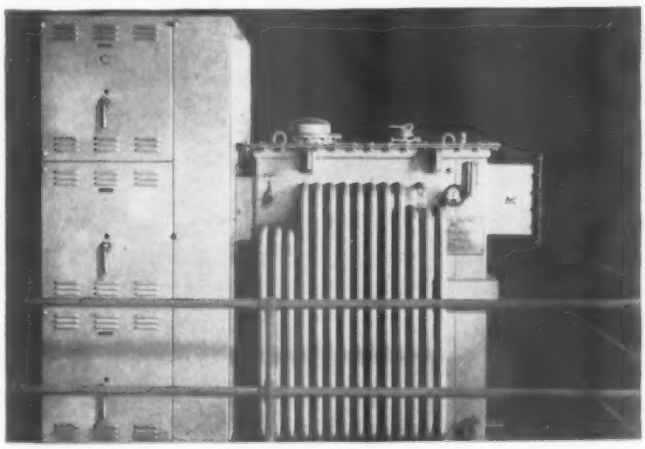
3. IN SAND RECLAMATION AND CONDITIONING. Vibrating screens for example, eliminated a scalping bottleneck for this foundry. A completely enclosed *Low-Head* screen and dust collector was installed which eliminated scalping problems. A complete line of A-C vibrating screens is available for all foundry screening jobs. Electrical improvements can help too. . . .

Foundromatic and Low-Head are Allis-Chalmers trademarks

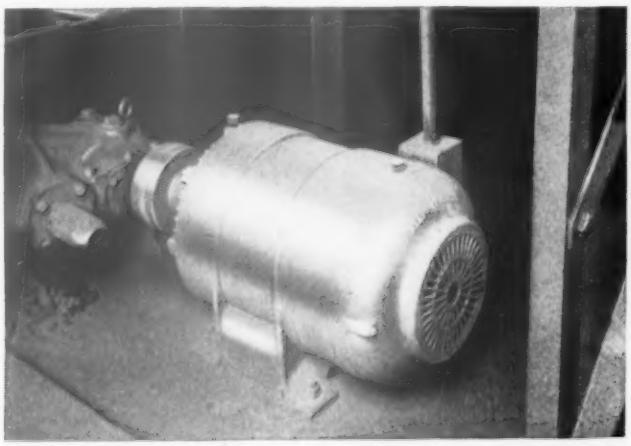
For Bigger Output...Better Working Conditions...MECHANIZE with



1. GOOD EXAMPLE are these two *Foundromatic* 2-bearing shakeouts which in conjunction with a sand slinger have almost *tripled* the casting output for the same amount of floor space with no extra help! *Foundromatic* shakeouts are in stock now in sizes: 4′ x 6′ Capacity 4 tons—5′ x 8′ Capacity 7½ tons—6′ x 8′ Capacity 18 tons—8′ x 10′ Capacity 25 tons. Series or parallel combinations for higher capacities. Here's another example . . .



4. LINE LOSSES can cut into foundry profits. Allis-Chalmers load center substations improve voltage regulation . . . cut losses by bringing *rated* voltage to foundry equipment. They are easy to install and maintain . . . eliminate long, costly runs of heavy secondary circuits . . . help to step-up machine efficiencies. A range of sizes for most foundry applications.



5. DEPENDABLE FOUNDRY POWER with a-c and d-c motors. Fan-cooled motors lick dirt, moisture and corrosion! Bulletin 6092A covers complete foundry line. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A 2390 MEMBER

ALLIS-CHALMERS

FOUNDRY

Another new chapter

52nd ANNUAL CONVENTION

Truly "another chapter will be added" to the progress and achievement of the foundry industry at the 52nd Annual Convention of The American Foundrymens Association in Philadelphia, Pennsylvania, May 3 to 7, 1948. All indications are that this forthcoming convention will really mark an important milestone of foundry progress and that the exhibition of new and improved equipment, modern casting practice and numerous accessories and supplies will be one of the most interesting and informative ever held in the fifty-two year history of the A. F. A.

The 1948 Convention will be the sixth time foundrymen have held this important meeting in the great and friendly city of Philadelphia. Located in one of our leading states in the production of cast metals, Philadelphia has always given the A. F. A. Convention enthusiastic support and the committees there are already hard at work to put over the 1948 convention in a very big way.

It is not too early for you to make your plans to attend the 52nd Annual Convention in May. Check carefully the program of technical sessions so that you will be sure to attend those of greatest value to you.

You will meet many foundrymen you know and also make new friends during these five days in Philadelphia!

THE FOUNDRY

CLEVELAND, OHIO

PROGRESS

will be added .....

PHILADELPHIA MAY 3·4·5·6·7

When the first issue of The FOUNDRY made its appearance in the fall of 1892, it was to fill the need of foundrymen for a magazine of their own. How well founded that idea was is borne out by the fact that The FOUNDRY has provided the only printed record of the achievements and progress of the cast metals industry down through the years. Today more than 35,000 readers of each issue constitute a glowing testimonial to the continuing service of The FOUNDRY to the foundry industry.

For many years The FOUNDRY has devoted two issues each year to special features concerning the A.F.A. Conventions and will do so again in 1948.

- THE MAY 1948 PRE-CONVENTION ISSUE will be the "Preview Issue". It will highlight the exhibit and the programs of activities for each day. In addition to all the regular editorial features, this great issue will carry added features concerning the 1948 convention. Watch for it and read it thoroughly!

- THE JUNE 1948 POST-CONVENTION ISSUE will present the "story of the show"; a report of the technical sessions plus all the interesting and valuable material contained in every issue throughout the year. The 1948 Post-Convention Issue will make another valuable addition to your library of foundry literature.

To all foundrymen these two issues of The FOUNDRY will be of outstanding interest and to all who sell and serve the foundry industry, these issues present an important advertising opportunity.

READING
THE FOUNDRY
MAKES BETTER
FOUNDRYMEN

• *Since 1892* •
Wherever Metals are Cast
A PENTON PUBLICATION

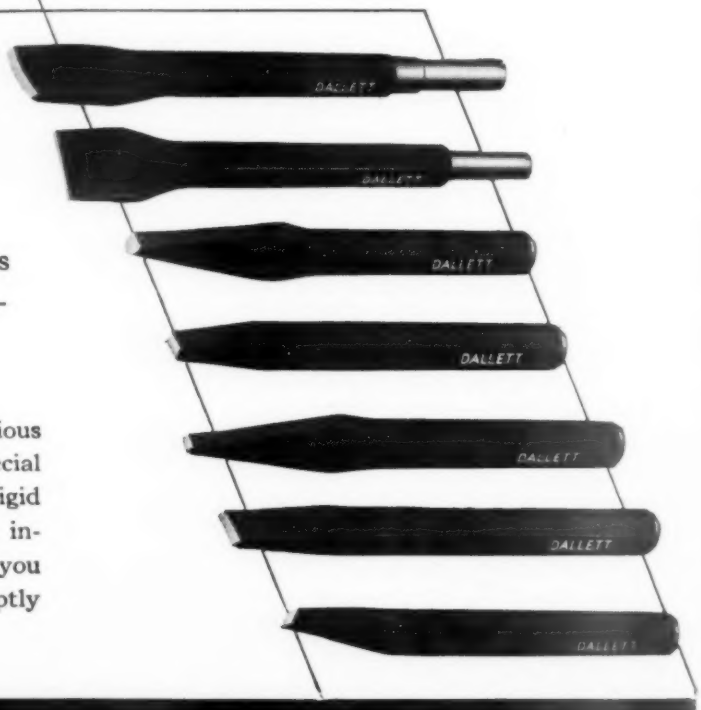
DALLETT PNEUMATIC
Since 1883
AND HAND CHISELS

SINCE 1883 The Dallett Company has been making quality tools. A reputation that is consistently emphasized in every Dallett product . . . In the Dallett line of chisels go only the finest of steel and the most exacting workmanship. Every chisel is scientifically heat-treated and carefully tested before it is permitted to bear the Dallett mark.

Dallett Pneumatic Chisel Blanks and Chisels are manufactured in most trade standard shanks . . . Chisels for Chipping Hammers, Scaling Tools and other uses are available in a wide variety of styles and sizes of cutting edges.

Safety Retainer Shank Chisels are carried in stock for most makes of small Pneumatic Tools with Retainer type bushings.

Write for Bulletin No. 200.



DALLETT FORGED TOOLS

A wide variety of Hand Chisels and Tools are generally in stock for immediate delivery. Write for Bulletin No. 210.

We have facilities and equipment to forge various special types of Pneumatic and Hand Tools. Special tools to meet any particular needs are made to rigid specifications. Our Engineering Department invites consultation on any special problems you might have. Estimates will be furnished promptly on any special hand-forged tools.

TOOL MAKERS
PNEUMATIC
DALLETT
EQUIPMENT
ACCESSORIES
SINCE 1883

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MASCHER AT LIPPINCOTT STREET, PHILADELPHIA 33, PA.

Manufacturers of Pneumatic Tools and Accessories

DISTRIBUTORS in principal cities throughout the United States, Canada, Europe and South America.

Reduce Pouring Costs with

Whiting Ladles

Built for

EASIER POURING

LONGER LIFE

LESS MAINTENANCE

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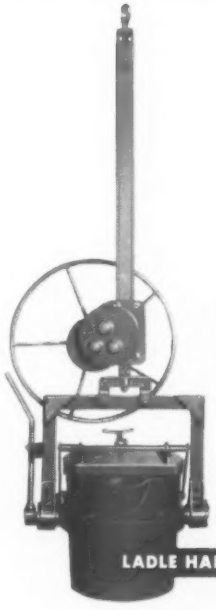
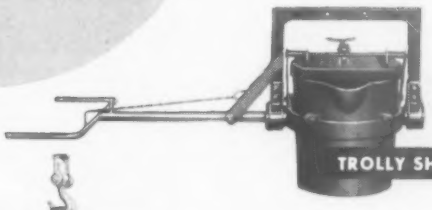
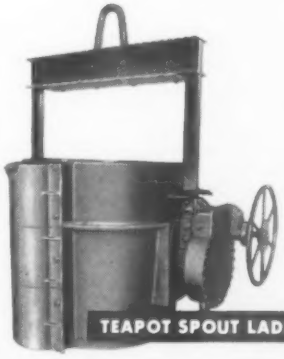

LADLE HANDLER

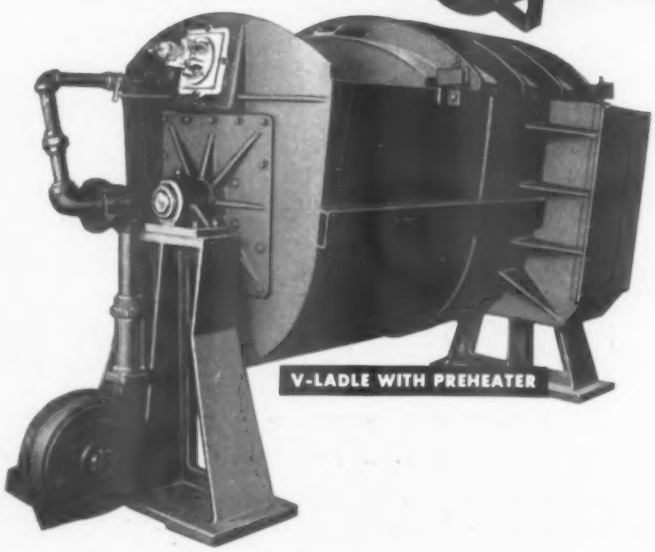

TROLLY SHANK LADLE

BOTTOM TAP LADLE


TEAPOT SPOUT LADLE

HAND TILT CYLINDRICAL

SLAG LADLE


V-LADLE WITH PREHEATER

Pour-Rite Ladles have all-welded bowls, air-cooled trunnions, antifriction bearings, and self-lubricated gearing with built-in alignment. Fully described in Bulletin FY-144.

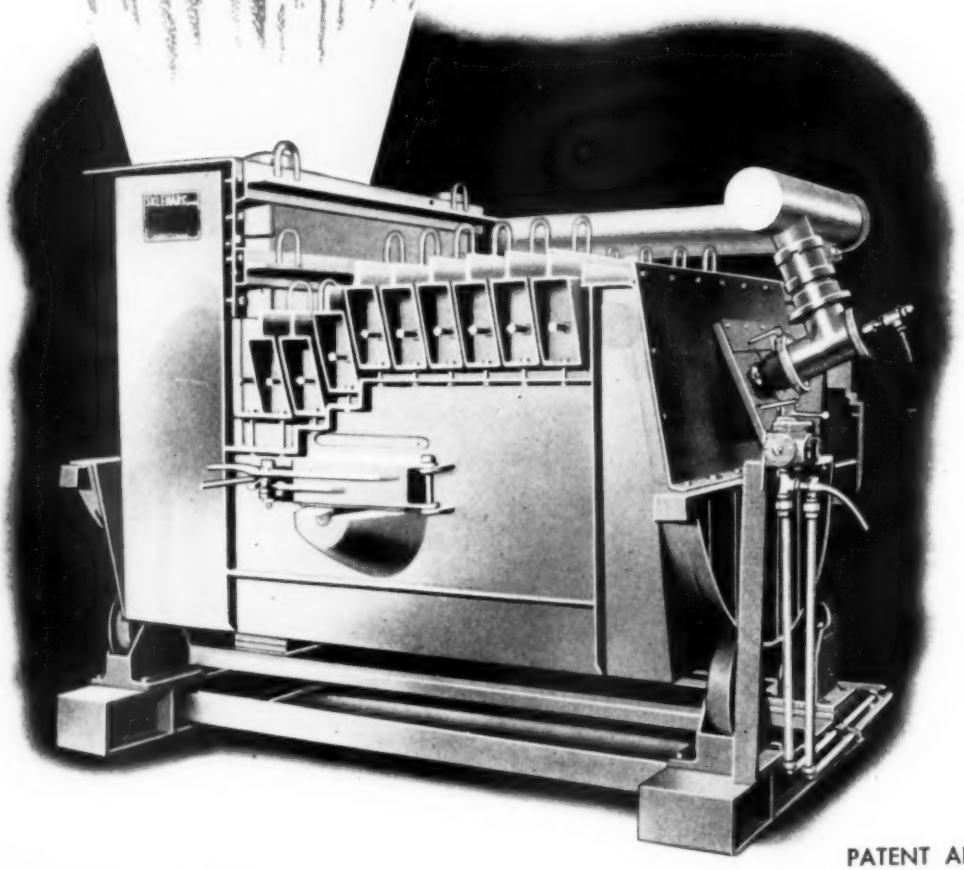
Whiting designs and manufactures complete material-handling, melting, and metal distributing systems.

WHITING
CORPORATION

15607 Lathrop Avenue, Harvey, Illinois

Offices in Chicago, Cincinnati, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, and St. Louis. Agents in other principal cities. Canadian Subsidiary: Whiting Corporation (Canada) Ltd., Toronto, Ontario. Export Department: 30 Church Street, New York 7, N. Y.

THE NEW *Sklenar*



PATENT APPLIED FOR
AND PATENTS PENDING

SKLENAR FURNACE AND

WILSON INDUSTRIES, I

38 MEMORIAL DRIVE- - - - - - - - C

testimony . . .

of Maintenance Economy —

(NAME OF THIS CUSTOMER SUPPLIED ON REQUEST)

Wilson Industries, Inc.
38 Memorial Drive
Cambridge 42, Mass.

Gentlemen:

This is a record for a six-month period during which time the SKLENAR FURNACE, #600-750 size, was placed in operation. The tables below show the comparative maintenance costs between the SKLENAR FURNACE and the regular type Crucible Tilting Furnace.

SKLENAR FURNACE - (600-750 lbs. cap.)

Total weight melted	259,270 lbs.
Number of heats	432
Total hours of labor	26
Number of fire bricks used	78 @ 1.02 78 @ .20
Cement used	100 lbs. 8.90 per cwt
Fire clay used	400 lbs. 3.00 per cwt

CRUCIBLE TILTING FURNACE

To melt the same amount of metal we would use:

#120 Crucibles	8 @ 22.00
Hours of labor	64 @ 1.02
Cement	400 lbs. @ 8.90 cwt
Fire clay	600 lbs. @ 3.00 cwt
Total daily preparation labor	172 hrs. @ 1.02
1 to 2 hours labor daily to prepare furnaces	

After getting the SKLENAR FURNACE into operation we did not have any repairs until we melted 142,756 lbs., at which time the Arch Bricks were reversed. At 160,628 lbs. we repaired the loading zone; at 221,181 lbs. we put a patch on left side of pouring area; at 250,000 lbs. we replaced reversed Arch Bricks, using 61 bricks. As of to date we melted 360,158 lbs. in 618 Heats and used a total of 89 Bricks and 27 hours repair labor. We are melting a 600 lbs. charge in 18 minutes, whereas the Crucible Furnace will run between 40 and 50 minutes for 360 lbs.

Very truly yours,

---- --- --------

(Name on Request)

COMPARISON OF COSTS

	SKLENAR	COST	CRUCIBLE TILT	COST
Total weight melted	259,270 lbs.		259,270 lbs.	
Number of heats	432			
Total hours labor (maint.)	26	26.52	64	65.28
Number Crucibles used (#120)			8	176.00
Fire brick	78	15.60		
Cement used	100 lbs.	8.90	400 lbs.	35.60
Fire clay used	400 lbs.	12.00	600 lbs.	18.00
Total hours labor daily for preparation	None		172 hrs.	175.44
Time of heats for melt	17 min. (600 lbs.)		40-50 min. (360 lbs.)	
Total Maintenance Cost		$63.02		$470.32

ID MANUFACTURING COMPANY

ES, INCORPORATED *Sole Distributors* ___

---CAMBRIDGE 42, MASS.

KORGLAZE

Completely

SMOOTH CORES

The illustration shown here suggests clearly how KORGLAZE works. One half of the core used in this casting was treated with KORGLAZE; the other half was untreated. The metal that lay against the KORGLAZED surface is smooth and clean; the metal that lay against the untreated surface is rough, lumpy ragged. Tests like this bring up startling contrasts, and demonstrate beyond doubt that KORGLAZE, by giving smoother cores, gives SMOOTHER CASTINGS. KORGLAZE is mixed with graphite, and the two products are stirred together cold. Cores may be dipped or sprayed, and treated hot or cold. Yes, you *can* make castings smooth as silk–KORGLAZE will do it for you. May we send you a sample?

LINBOND · KORBOND · AQUA · BOND · AQUA-SET · KORGLAZE · TOP-BOND

United Oil Mfg. Co.

1429 WALNUT ST., ERIE, PA.

Now A torch for cutting stainless steel!

It's new–different– uses standard Airco tips

This new cutting torch, supplementing Airco's line of machine equipment, brings economical *manual* flame cutting of stainless steels within the scope of all types of mill and shop operations — makes it as easy to cut stainless as mild steel.

Designated in its 21″ length as Style 9016, this new torch is also available in a 36″ length. Both lengths come with a 90° torch head. In addition to a 25 foot electric cable, the outstanding features include:

1. Remote Control Cut-Off — automatically coordinates the flux feed with the cutting oxygen—eliminates separate flux control.
2. Uses Standard Cutting Tips — no special tips or attachments to buy.
3. Monel Metal Head — means durability — long trouble-free service.
4. Stainless Steel Tubes — which provide great rigidity and heat resistance.
5. Stainless Steel Lever and Ribbed Handle — designed to afford maximum ease of operation.

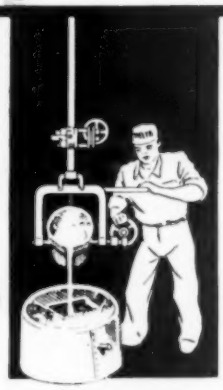
The new Airco 9016 uses the Flux-Injection principle. This Airco stainless steel cutting method feeds flux from a Flux Feeder Unit into the cutting oxygen stream. Thus, the flux is continuously and evenly dispersed throughout the entire cutting operation. The Flux Feeder Unit is portable, even when fully charged, so rapid movement from job to job is assured.

If you would like to have this torch demonstrated in your shop . . . or if you desire more information on stainless steel cutting in the form of a reprinted article; address: Dept. 8144, Air Reduction, 60 East 42nd Street, New York 17, N. Y. In Texas: Magnolia Airco Gas Products Company, Houston 1, Texas. On West Coast: Air Reduction Pacific Company, San Francisco 4, California. International Representatives: Airco Export Corporation, New York 18, New York.

AIRCO **AIR REDUCTION**
Offices in All Principal Cities

Headquarters for Oxygen, Acetylene and other gases . . . Carbide . . . Gas Welding and Cutting Apparatus and Supplies . . . Arc Welders, Electrodes and Accessories

FROM MONTREAL
TO MEXICO CITY...



FROM PHILADELPHIA
TO LOS ANGELES...

WHEREVER METALS ARE POURED

DELTA FOUNDRY PRODUCTS

ARE AVAILABLE FOR IMMEDIATE SHIPMENT

No matter where your foundry is located there is an authorized, exclusive DELTA distributor convenient to you and, from stocks on hand, will make immediate shipments of your orders for DELTA FOUNDRY PRODUCTS.

DELTA FOUNDRY PRODUCTS

Plastic-type Core & Mold Washes — for Steel Malleable, Grey Iron, Non-Ferrous Metals. *No-Vein Compound, Chillkoat, Spray Binders, Permi-Bond, Partex, Bondite, Mudding Compound, Core Rod Dip Oils, Sand Conditioning Oils, Pyro-Koat, Liquid Parting, Core Oils* and *Binders.*

Ask for a liberal working sample of any DELTA FOUNDRY PRODUCT for test purposes. You will also receive complete instructions for use.

BUFFALO New York	Queen City Sand & Supply Co.
PHILADELPHIA Pa.	Pennsylvania Foundry Supply & Sand Co.
PITTSBURGH Pa.	The S. Obermayer Co.
CINCINNATI Ohio	Goehringer Foundry Supply Co.
ST. LOUIS (Edwardsville, Ill.)	Midwest Foundry Supply Co.
SEATTLE Wash.	Carl F. Miller & Co.
PORTLAND Ore.	Carl F. Miller & Co.
SAN FRANCISCO Cal.	Industrial Foundry Supply Co.
LOS ANGELES Cal.	Independent Foundry Supply Co.
●	
CANADA	
MONTREAL Quebec	Canadian Foundry Supplies & Equipment, Ltd.
TORONTO Ontario	Canadian Foundry Supplies & Equipment, Ltd.
VANCOUVER B. C.	Industrial Supplies, Ltd.
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MEXICO	
MEXICO D. F. Mexico	Casa Covacevich.

DELTA OIL PRODUCTS CO.

MILWAUKEE 9, WISCONSIN

22B For light bench and core work in small flasks.

22F For light ramming in deep flasks.

44B For medium bench and molding machine work.

44F For light floor molding or bench molding in deep flasks.

65B For heavy bench ramming.

65F For floor molding and deep flasks.

Introducing THE NEW ROTOR RAMMERS!

HERE'S the new line of Rotor Powerplus Sand Rammers . . . six speedy, light-weight performers . . . to give you *more uniform casting molds, faster.* Step right up and see how they can *cut your costs.*

Write for free copy of Bulletin 32.

Call the Rotor Analyst for a free demonstration with the proper model of these new rammers to match your work. See him use a mold hardness tester to show how the new Rotor Rammer improves the density and uniformity of your molds. Try the rammer yourself and see how its sharp, snappy blow saves time by putting the sand down faster.

AIR O'TOOL

GRINDERS

THE ROTOR TOOL CO.

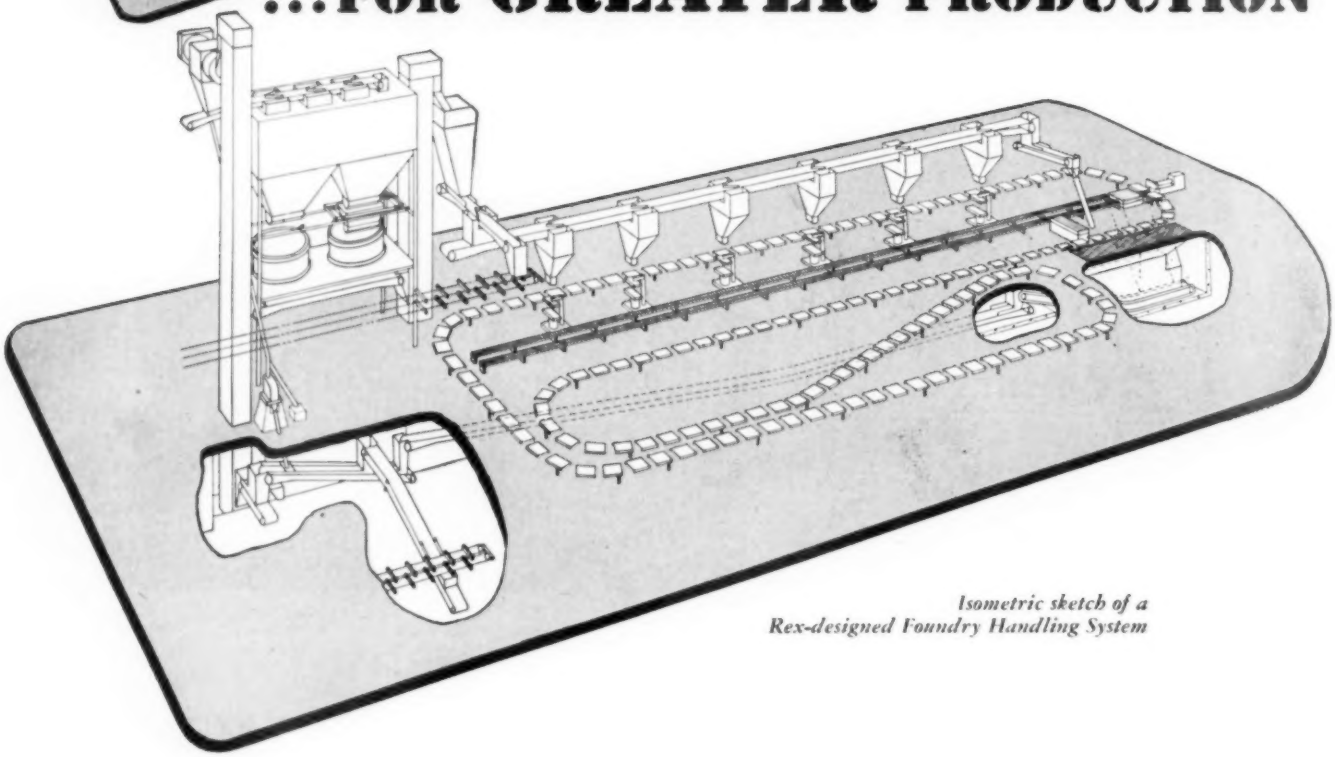
CLEVELAND, OHIO

RAMMERS

UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS

PATTERN

...FOR GREATER PRODUCTION



Isometric sketch of a Rex-designed Foundry Handling System

Large foundry or small, the pattern for increased capacity is an efficient Rex Foundry Handling System. By bridging the gaps between foundry operations . . . the handling and reconditioning of sand . . . the conveying of molds . . . the moving of castings, a continuous production flow is assured that permits the greatest output at lowest cost per square foot of floor space.

Rex Foundry Handling Systems, individually engineered to fit each job, will insure increased output, eliminate unnecessary handling and reduce the cost of indirect labor. Foundry-trained engineers will be glad to design and install a capacity-increasing, cost-cutting system . . . a system that will not only mean more profit but good employee relations by cutting worker fatigue. For all the facts, write Chain Belt Company, 1671 W. Bruce St., Milwaukee 4, Wisconsin.

REX **FOUNDRY HANDLING SYSTEMS**
CHAIN BELT COMPANY OF MILWAUKEE

NOT A BRAND,

BUT A BRAND PROTECTOR

"CIRCLED R"

TIMKEN®

It tells the world that "TIMKEN" is registered as a trade-mark in the United States Patent Office and cannot lawfully be used to designate products other than those manufactured by The Timken Roller Bearing Company — Timken Tapered Roller Bearings, Timken Alloy Steels, Timken Seamless Steel Tubing and Timken Rock Bits.

The trade-mark "TIMKEN" is the buyer's assurance of the finest products in their respective fields. Look for it. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN

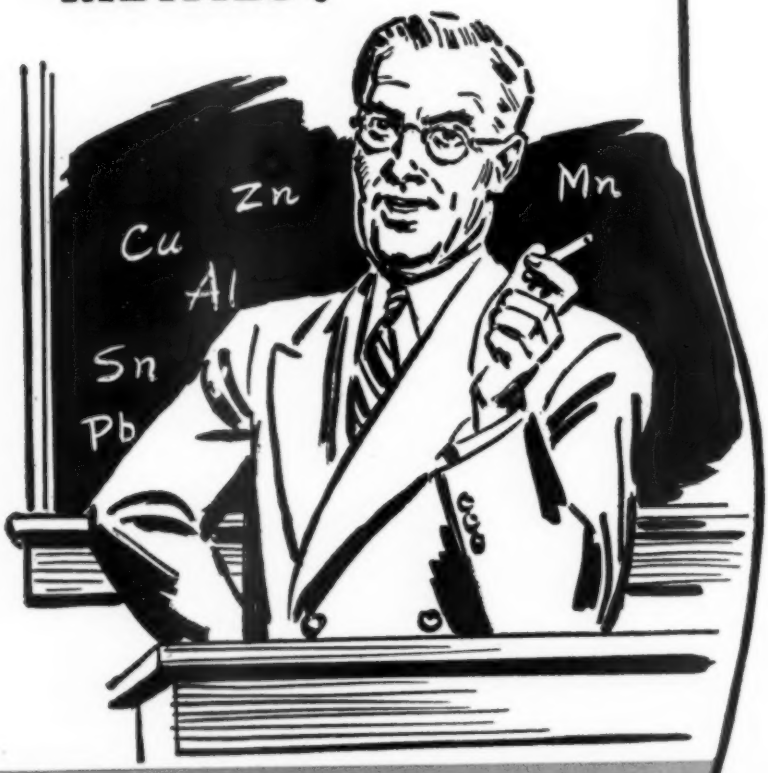
TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ▯ AND THRUST ▯ LOADS OR ANY COMBINATION

how much do you know

ABOUT NON-FERROUS METALS?



1. ***What is the main purpose in superheating magnesium casting alloys?***

(a) To increase fluidity
(b) To eliminate impurities
(c) To improve tensile strength
(d) To prevent gas porosity

2. ***What is Tenzaloy?***

(a) A new Federated aluminum alloy that gives high strength without heat treatment
(b) A zinc-base die casting alloy
(c) A 10% magnesium-aluminum alloy
(d) A 10% silicon-aluminum alloy

3. ***Approximately how much nickel is required in a nickel silver alloy to insure complete whiteness?***

(a) 10%
(b) 18%
(c) 25%
(d) 30%

4. ***Which of the following commercial metals has the best machinability?***

(a) Brass
(b) Bronze
(c) Aluminum
(d) Magnesium

Federated

METALS DIVISION

AMERICAN SMELTING AND REFINING COMPANY

120 BROADWAY, NEW YORK 5, N.Y.

5. ***If the mechanical properties of a test bar are above requirements, it proves that:***

(a) Castings of the same metal have the same properties
(b) The castings are pressure-tight
(c) The castings are satisfactory
(d) You made a good test bar

6. ***If the same casting conditions prevail, which type of mold will give the fastest cooling rate?***

(a) Green sand (c) Plaster mold
(b) Dry sand (d) Permanent mold

7. ***What is the electrical conductivity of 85-5-5-5?***

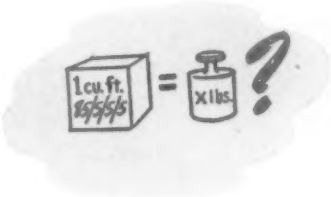
(a) 9.8% (c) 32.6%
(b) 16.4% (d) 84.5%

8. ***Which property of an aluminum alloy usually shows the greatest improvement shortly after solution treatment?***

(a) Tensile strength
(b) Elongation
(c) Hardness
(d) Impact strength

9. ***Approximately what would be the electrical conductivity of an alloy consisting of 99% copper and 1% tin?***

(a) 55% (c) 85%
(b) 75% (d) 95%



10. ***What is the approximate weight of a cubic foot of 85-5-5-5?***

(a) 450 lbs. (c) 405 lbs.
(b) 540 lbs. (d) 650 lbs.

HOW TO RATE YOUR SCORE

If you answered all 10 questions correctly, consider yourself an A-1 expert. 8 or 9 right is above average. Anything below 7 indicates that a little reading on the subject of non-ferrous metals would help considerably. Try some of Federated's easily understood literature (experts invited, too). Simply fill in and mail the coupon on this page.

If you have any foundry problems, a practical Federated service man is ready to help. Call or write any of Federated's 11 plants or 25 sales offices across the nation, or FEDERATED METALS DIVISION, AMERICAN SMELTING AND REFINING COMPANY, 120 Broadway, New York 5, N. Y.

FEDERATED METALS DIVISION Dept. F
AMERICAN SMELTING AND REFINING COMPANY
120 Broadway, New York 5, New York
Please send me the items I have checked:

- ☐ Non-Ferrous Metals and Alloys booklet
- ☐ Aluminum Casting Alloys booklet
- ☐ Test Bars booklet
- ☐ Di-Metal for Better Die Castings booklet
- ☐ Reprints of technical articles
- ☐ Tenzaloy pamphlet

Your name.....
Company name.....
Address.....
City..... Zone..... State.....

ANSWERS: 1. (c) To improve tensile strength. 2. (a) A new Federated aluminum alloy that gives high strength without heat treatment. 3. (b) 18%. 4. (d) Magnesium. 5. (d) You made a good test bar. 6. (d) Permanent mold. 7. (b) 16.4%. 8. (d) Impact strength. 9. (a) 55%. 10. (b) 540 lbs.

THIS HINES

HAD TO

THE DRAG
15" x 50" x 4"

HINES ALUMINUM DRAG FLASK . .	46 lbs.
BOTTOM BOARD .	32 lbs.
SAND	148 lbs.
Total Weight . .	226 lbs.

A LIFT OF 113 LBS. PER MAN

A flask this size does involve a substantial amount of sand and therefore must be sturdy and rigid enough to maintain its accuracy under the resulting heavy pressures. The Hines ALUMINUM "Pop-Off" Flask on this job met all requirements and still was handled easily by hand.

HINES
POP-OFF
(Trademark Reg. U. S. Pat. Off.)
FLASK

BUILDERS OF FLASKS AND JACKETS EXCLUSIVE

THE HINES

3431 WEST 140th ST.

ALUMINUM "POP-OFF" FLASK

BE STRONG · STIFF · RUGGED

Note how easily this cope is handled by hand in the illustration above. Sand was the only weight factor here.

A LIFT OF 149 LBS. PER MAN

THE COPE
15" x 50" x 6"

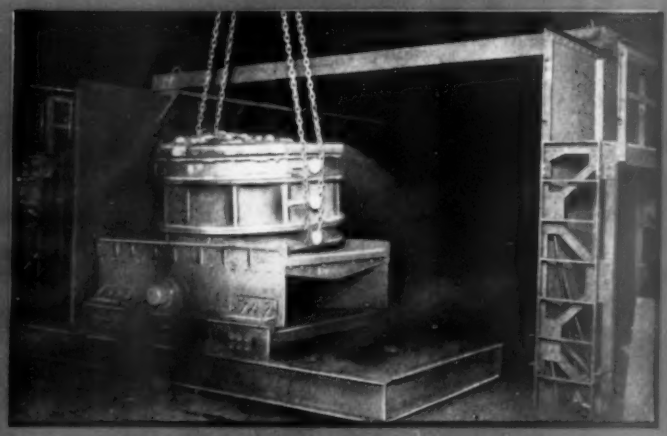
HINES ALUMINUM COPE FLASK .	77 lbs.
SAND	221 lbs.
Total Weight . .	298 lbs.

OR OVER TWENTY-FIVE YEARS

FLASK CO.

CLEVELAND 11, OHIO

61.6% OF ALL SHAKE-OUTS IN U. S. FOUNDRIES ARE SIMPLICITYS!



Simplicity shake-out units now in operation in U. S. foundries outnumber all other makes and types combined. Facts prove it!

Fact #1. A recent survey made by FOUNDRY magazine show there are 2,708 shake-out units of every description and all ages installed in foundries throughout the country. This figure includes, in addition to the modern platform type shakeout, such kinds as the "air-jolt" variety, the "vibrating baie" type and every other conceivable air or mechanical operated model in existence.

Fact #2. Since entering the foundry equipment field in 1933, Simplicity has designed, built, sold, and installed 1,670 shake-out units.

Fact #3. Simple arithmetic shows the great preference for Simplicity equipment—**61.6%!**

The reasons for Simplicity shake-out leadership are simple. The Simplicity special solid counterbalancing shaft produces irresistible vibration. Castings are separated from flasks swiftly, cleanly, easily. Shake-out time, labor, and costs are slashed to absolute minimum. Massive construction practically eliminates maintenance and repair, efficient design conserves floor space. Simplicity Shake-out Units are available in standard sizes for permanent or portable installation with capacities from 500 to 100,000 lbs.; special sizes to order. Send us your shake-out problems for suggestions without obligation, and ask for your copy of the complete Simplicity Foundry Equipment catalog.

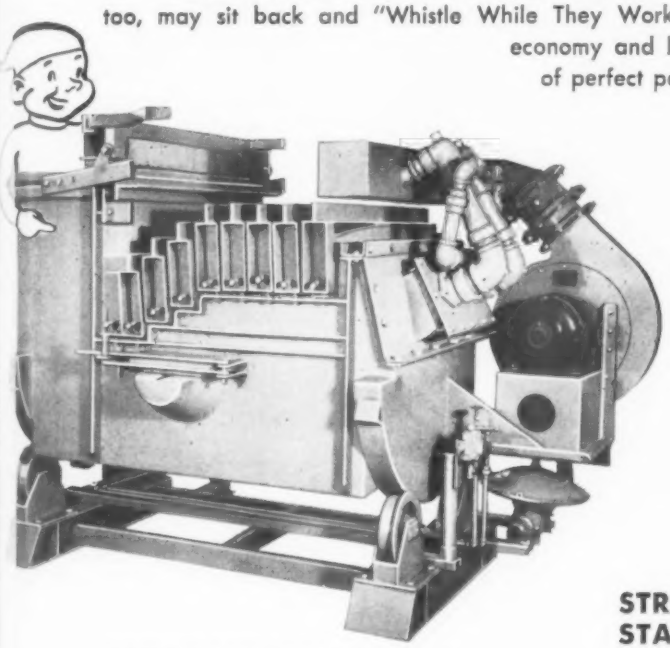
- SALES REPRESENTATIVES IN ALL PARTS OF THE U. S. A.
- FOR CANADA: CANADIAN BRIDGE ENGINEERING CO. LTD., WALKERVILLE, ONTARIO
- FOR EXPORT: BROWN & SITES, 50 CHURCH ST., NEW YORK 7

Simplicity
TRADE MARK REGISTERED

ENGINEERING COMPANY, DURAND, MICHIGAN

YOU can whistle . . . while THEY work!

Here are a few furnaces that are now being used by many of the leading organizations in the foundry, die casting and permanent mold industries throughout this country of ours. They have done their respective jobs well! The fact is, when you install a Stroman Furnace for any non-ferrous metal melting job, you too, may sit back and "Whistle While They Work," for their efficiency, economy and longevity are your assurance of perfect pours, every time, at lowest costs.



STROMAN CRUCIBLE STATIONARY MELTING FURNACES

For Brass, Bronze, Aluminum and other non-ferrous metals. Sturdy, efficient and featuring the Stroman Push-Back Cover these stationary furnaces are designed for peak production and greatest fuel economy. Oil or Gas Fire. Capacities from No. 20 to No. 400 crucible.

ECONOMELT FURNACES

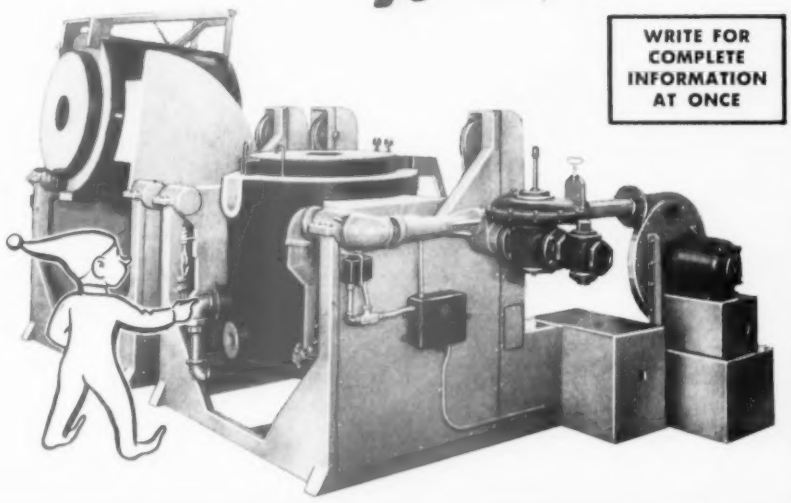
The Best Direct Fired Reverberatory Melting Furnace on the market! Its speed in melting Brass, Bronze, Grey Iron or Aluminum is unmatched! Continuous charging . . . with cold metal never reaching the molten bath, makes it practically a continuous pour furnace . . . and it will show upwards of 40% in fuel cost savings. Oil or gas fire. Also can be furnished with combination oil, gas burner. Capacities (Brass) up to 2000 lbs. Write for Bulletin No. 635 for full information.

STROMAN IRON POT STATIONARY MELTING FURNACES

These furnaces are highly recommended as break down furnaces for zinc die casting plants. They also excel as aluminum holding furnaces. They can be supplied with or without hoods to exhaust fumes and heat. Their construction assures longest pot life and lowest fuel costs. Choice of manual or automatic controls and gas or oil fire. Capacities from 212 to 14,000 lbs. of zinc.

WRITE FOR COMPLETE INFORMATION AT ONCE

STROMAN MECHANICAL OR HYDRAULIC TILT CRUCIBLE MELTING FURNACES



For Brass, Bronze, Aluminum and other non-ferrous metals. Stationary Lip Pour assures a constant pouring arc, eliminating the necessity of moving the ladle at any time during a pour. They are excellent for use in permanent mold and die casting plants as well as any foundry. Their sturdy construction assures longest life, and their economical operation results in lowest production costs. Oil or gas fire. Built in sizes to handle capacities from No. 125 to No. 400 crucible.

STROMAN FURNACE & ENGINEERING CO.

DIVISION OF

THE PETERSEN OVEN CO. • 9900 FRANKLIN AVE. • FRANKLIN PARK, ILL.

Announcing...

Randall TWIN FURNACE

"DESIGNED TO PRODUCE"

NEW · ECONOMICAL · MANY PRODUCTION BENEFITS

Pilot installations show that foundrymen can expect considerable operating economy with this new twin furnace.

At last, you can have a *top fired* crucible furnace which combines TWO furnaces into ONE complete production unit. Randall-Twin pays for itself.

Twin melting furnaces are interconnected. While top firing one of the twin furnaces "A," the charge in the crucible of furnace "B" is being preheated by waste heat from "A." After pouring and recharging the crucible in "A," furnace "B" is top fired thus reversing the process and the charge in furnace "A" is preheated.

With gas at 19 C. F. M. a heat is pulled from a No. 70 crucible every 20 to 25 minutes.

Each furnace has a separate cover and the furnace tender can charge each furnace in the conventional manner. Nothing new to learn.

RANDALL-TWIN FURNACES ARE PAYING FOR THEMSELVES OUT OF SAVINGS *ALONE* IN 12 TO 18 MONTHS. Write for literature and prices.

THE RANDALL FOUNDRY EQUIPMENT CORPORATION
Newburgh Station, Cleveland 5, Ohio

Randall TWIN FURNACE
will save you money

HERE ARE BENEFITS YOU GET FROM Randall TWIN

1. Cuts fuel costs.
2. Waste heat from one furnace used in preheating the other.
3. Less temperature loss.
4. Uniform temperature.
5. More production.
6. Easier on furnace tender.
7. No spiralling flame.
8. Metal lies dormant.
9. Longer crucible life (50%).
10. Metal from leaking crucible can be saved.
11. 25% longer lining life.
12. No weekly patching job.
13. Less oxidation.
14. Less metal shrinkage.
15. No plugged burners.
16. Lower installation cost.
17. Shipped complete.
18. One gas and one air line connects both furnaces.
19. Foolproof controls.
20. Pays for itself in savings alone.

MAIL COUPON TODAY AND SEE WHAT YOU CAN SAVE!

COMPANY NAME_____

YOUR NAME, TITLE_____

ADDRESS_____

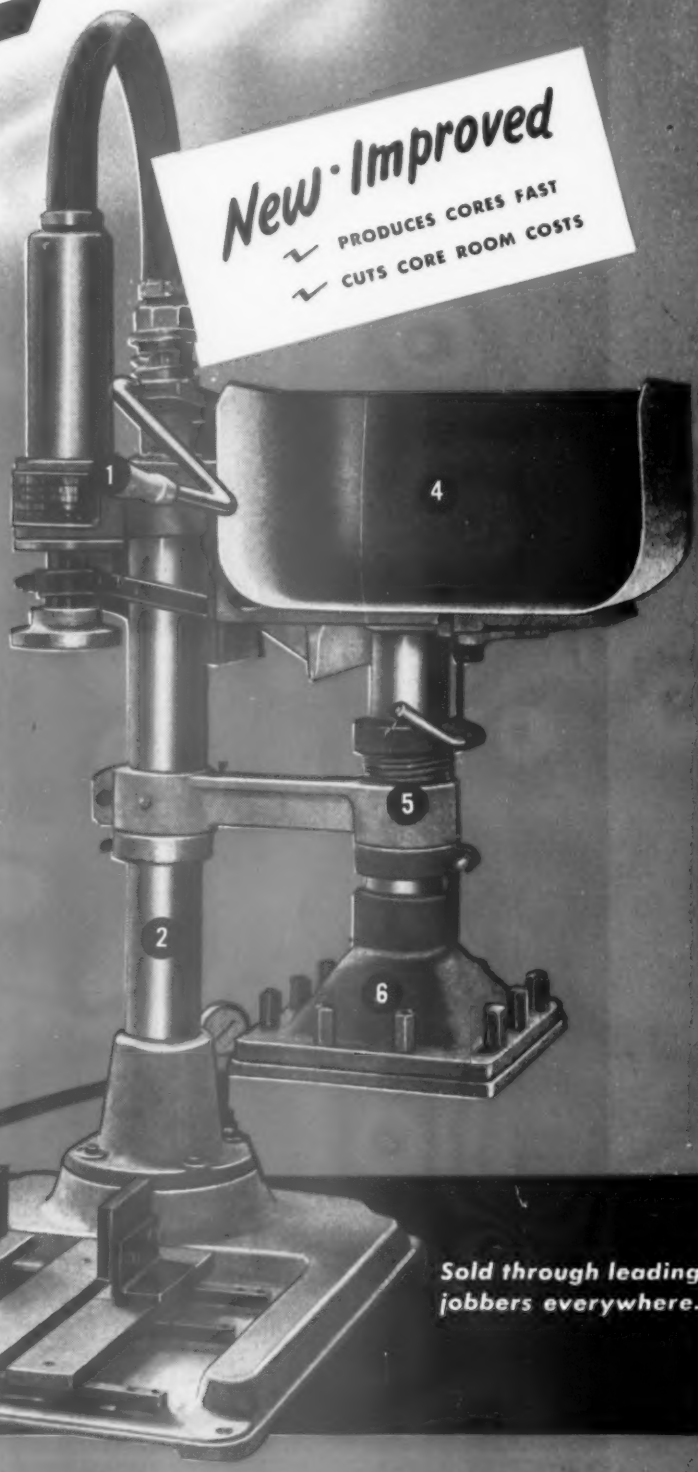
CITY_____ STATE_____

Randall CORE BLOWER

"DESIGNED TO PRODUCE"

New · Improved

- PRODUCES CORES FAST
- CUTS CORE ROOM COSTS



This new and improved Randall Core Blower puts small core runs on a production basis. You can really produce with this bench model machine.

Equally important, you can Blow 'Em as You Need 'Em . . . eliminating a large stock of cores in the core room . . . a great saving in this feature alone.

See your jobber and ask him for a demonstration or write direct to us.

THE RANDALL FOUNDRY EQUIPMENT CORPORATION

Newburgh Station, Cleveland 5, Ohio

1. Simultaneous Blowing and Clamping—One Lever.
2. Rear Column serves as Air Reservoir.
3. "Randall Snap-action" Toggle Side Clamp for Vertical Boxes.
4. Sand Hopper.
5. Swing-type Blow Head Permits Quick Filling. Reduces Operator Fatigue.
6. Blow Head can be Turned to Any Angle. Blow Plate has 9½" by 7" Blowing Surface.

Operators like the Randall because they can blow several boxes with one filling of the sand magazine. The Randall reduces operator fatigue and ups production.

Sold through leading jobbers everywhere.

THE Randall CORE BLOWER

"DESIGNED TO PRODUCE"

Fast, Smooth Cutting

Action *plus* Long Life-

NORTON B-5 and B-7 RESINOID Wheels Give You *Both*

HERE'S a sure way to help hold down soaring production costs! Put these cost-cutting Norton Resinoid Wheels to work on your high speed foundry grinding jobs. They really do cut fast and smooth, *without* sacrificing wheel life.

B-5 Resinoid Bond is popular for wheels in the soft and medium-hard range, while B-7 Resinoid Bond, a stronger and more heat-resistant bond, is designed for wheels in the harder grades.

Both of these outstanding resinoid bonds are available with Norton Alundum and Crystolon abrasives, and you'll find a wheel of exactly the right combination to provide the fast, economical results you're after.

Why not reduce costs *now* on cleaning room grinding jobs? Contact your Norton abrasive engineer or distributor for specific wheel recommendations.

NORTON COMPANY • WORCESTER 6, MASS.

Distributors In All Principal Cities

W-1159

NORTON ABRASIVES

P M

NONE BETTER

MELTRITE

More used than any other Merchant PIG IRON

Such Preference Must be Merited!

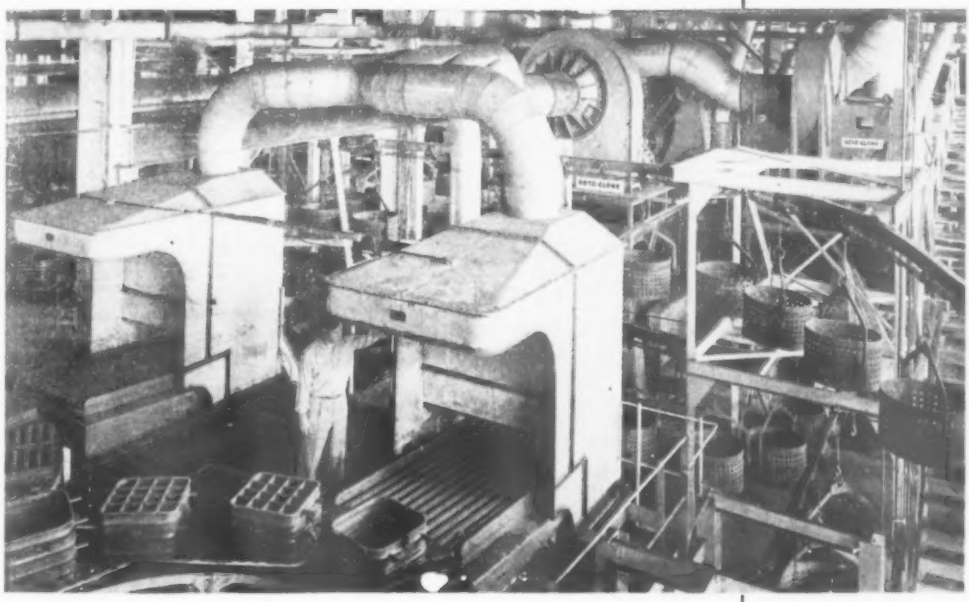
PICKANDS MATHER & CO.

Cleveland • Chicago • Detroit • St. Louis • Erie
Duluth • Minneapolis • Toledo

IRON ORE • PIG IRON • COAL • COKE

When they Modernize they Standardize

on ROTO-CLONE Dust Control



Two of five Roto-Clones installed by Kirk & Blum in this modernized foundry that supply effective dust control for Jeffrey sand conditioning and shakeout systems.

EVERY major dust source in this modern grey iron foundry is controlled effectively by an AAF Roto-Clone.* Pictured in foreground are two 4 x 8 shakeouts from which a Type W Roto-Clone exhausts 25,000 C.F.M. At right rear another Type W exhausts 13,000 C.F.M. from airless abrasive cleaning units and tumbling mills. A total of five Roto-Clones, exhausting over 90,000 C.F.M., serve this foundry.

The Type W Roto-Clone is a foundry favorite because of its high efficiency, constant air delivery and uniform performance under all conditions. It combines the functions of exhausting, separating and ejecting dust in a single unit. And, with the addition of water sprays, effectiveness of the dynamic forces is extended to the collection of the lightest and finest dust particles.

There's a Roto-Clone of a type and size to solve every foundry dust problem. Write today for Bulletin No. 270-A.

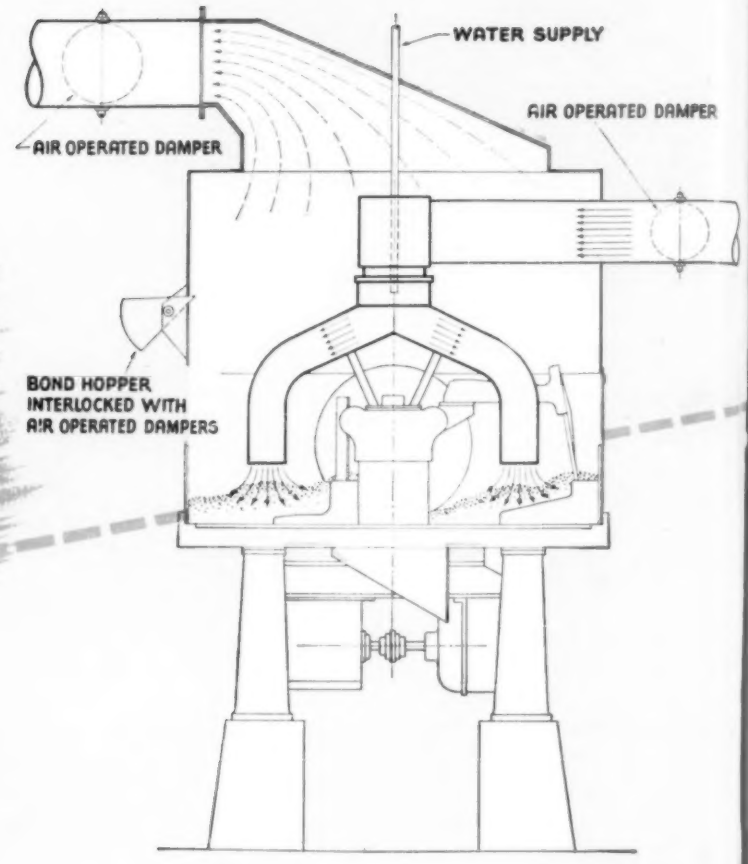
*Roto-Clone is the trade-mark (Reg. U. S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and hydro-static precipitator types.

AMERICAN AIR FILTER CO., INC.
266 Central Ave., Louisville 8, Ky.
In Canada: Darling Bros., Ltd., Montreal, P. Q.

AAF
ROTO-CLONE®
DUST CONTROL EQUIPMENT

Here's the solution to your HOT SAND problem...

Install the new NATIONAL *Rotary Cooling Hood* on your SIMPSON MIXER



—*IMPROVES MOLDABILITY*
—*REDUCES SCRAP*
—*CUTS OPERATING COSTS*

Reproduced on the opposite page is another expression of confidence from a user of the new National Rotary Cooling Hood installed on an existing No. 3 Simpson Intensive Mixer handling facing sand. The rapid, efficient cooling reported by this company demonstrates the kind of performance the new Rotary Cooling Hood will deliver in *any* foundry.

Now available for installation on standard Simpson Intensive Mixer models, this new high-capacity Rotary Cooling Hood provides *complete control* of sand temperatures throughout mixing cycles, even under the most extreme sand temperature conditions.

Here's how it works...

The basic principle employed in the new Rotary Cooler is the proved mechanical principle of cooling through evaporation. Excess moisture is added to the sand, and air at high velocity is forced through the sand as it passes over the plows. As the moisture is evaporated, the heat in the sand is transferred to the vapor generated, and carried out of the mixer. A slight vacuum is maintained in the mixer to prevent dust laden air from escaping into the work area.

LET A NATIONAL ENGINEER SHOW YOU HOW THE NEW ROTARY COOLING HOOD WILL HELP SOLVE YOUR HOT SAND PROBLEMS . . .

Call or write for details!

NATIONAL ENGINEERING COMPANY

608 MACHINERY HALL BUILDING • CHICAGO 6, ILLINOIS

THE PROOF

ELECTRIC STEEL CASTINGS COMPANY
SPEEDWAY, INDIANAPOLIS 24, IND.

National Engineering Company,
549 West Washington Blvd.,
Chicago, 6, Illinois.

Gentlemen:

We are now operating our #3 Simpson Intensive Mixer with Unit Drive and #2 National Aerator.

We are completely satisfied with its efficient and thorough mulling operation.

We would like to compliment your Engineering Department on the development of your rapid and efficient cooling hood and have taken the liberty of listing some examples of its efficiency recorded in today's operations:

TIME	TEMPERATURE		
Charged	160°F	215°F	310°F
After 1 Minute	124°F	140°F	150°F
" 2 "	118°F	120°F	133°F
" 3 "	98°F	106°F	116°F
" 4 "	94°F	102°F	106°F
" 5 "	90°F	96°F	98°F
Discharged	88°F	92°F	92°F

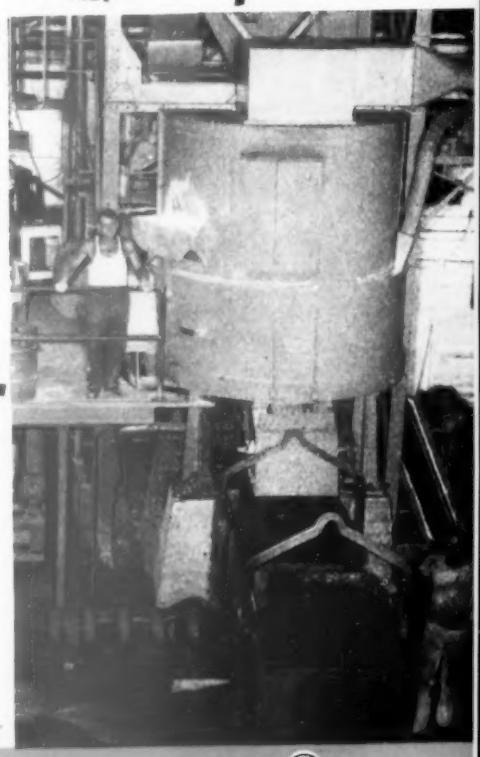
We are so enthusiastic about the performance of your #3 Simpson Intensive Mixer that we featured it in our ad in the October 1947 issue of METAL PROGRESS Magazine on Page 692 in which we advertised, "Quality Steel Castings Through Controlled Sand"

We would be very glad to recommend and demonstrate the speed and economy of this mill to any of your prospective customers that might be interested

Yours very truly,
ELECTRIC STEEL CASTINGS COMPANY
William B. Ziegelmueller,
Vice President & General Manager.

WBZ:HF

LO DUCTEN
FOR SUPER SERVICE



● In the operation described above, facing sands are being prepared using a 5-minute mixing cycle. Full time is being utilized in lowering sand temperature. It is important to note, however, that the same cooling results can also be accomplished in a normal 2-minute mixing cycle . . . Shown at the right is the complete No. 3 Simpson Mixer installation which is so highly praised in the letter above.

Manufacturers and Selling Agents for Continental European Countries—The George Fischer Steel & Iron Works, Schaffhausen, Switzerland. For the British Possessions, Excluding Canada and Australia—August's Limited, Halifax, England. For Canada—Dominion Engineering Co., Ltd., Montreal, Canada. For Australia and New Zealand—Gibson, Battle & Co., Pty., Ltd., Sydney, Australia.

MANUFACTURER'S ASSOCIATION, INC. FOUNDRY EQUIPMENT

improve the quality and uniformity of your castings with

CLECO RAMMERS

For the economy-minded — Cleco Rammers operate with exceptionally low air consumption and low maintenance costs.

Valves are end-pressure-seating in all models and are designed to permit passage of dirt without injury to the valve mechanism. These valves are long-lasting and trouble-free.

Efficient lubrication — highly important in tough, rugged foundry service — is assured by the large built-in oil chamber and flow regulator.

BACK OF CLECO PRODUCTS . . . with 25 years experience in precision manufacturing, is the REED ROLLER BIT COMPANY, one of the largest companies of its kind in the world.

We assure you:
THE MOST ADVANCED ENGINEERING • UNIFORM AND STANDARDIZED QUALITY PRODUCTS • WORLD-WIDE DISTRIBUTION AND COMPLETE SERVICE FACILITIES TRADITIONAL WITH REED.

Write for Bulletin No. 76-B. It describes Cleco Rammers in full detail.

CLECO AIR TOOLS

CLECO ACCESSORIES

CLECO DIVISION

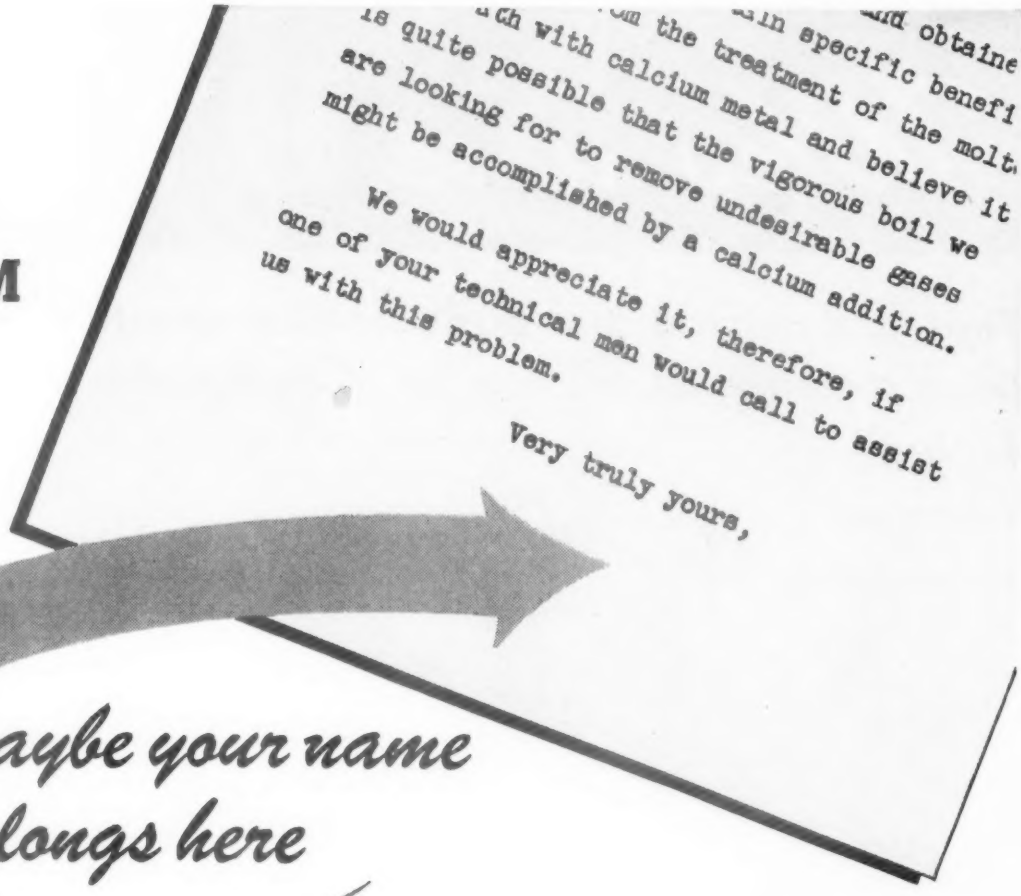
of the REED ROLLER BIT COMPANY, P. O. Box 2119, Houston, Texas, U.S.A.

DIVISION OFFICES

MISSOURI	NEW JERSEY	RAILROAD DEPARTMENT	OHIO	PENNSYLVANIA
2322 Locust St.	75 Lock St.	50 Church St.	431 Temple Bar Bldg.	Mascher at Lippincott Sts.
St. Louis	Newark	New York 7, N. Y.	Cincinnati	Philadelphia, 33

IN CANADA: CLECO PNEUMATIC TOOL COMPANY of CANADA, LTD., 927 MILLWOOD ROAD, TORONTO (LEASIDE), ONTARIO

DISTRIBUTORS IN PRINCIPAL CITIES OF THE UNITED STATES AND THROUGHOUT THE WORLD


...and obtaine
...in specific benefi
...om the treatment of the molt
...ch with calcium metal and believe it
is quite possible that the vigorous boil we
are looking for to remove undesirable gases
might be accomplished by a calcium addition.
We would appreciate it, therefore, if
one of your technical men would call to assist
us with this problem.
Very truly yours,

Because **CALCIUM** has so many uses

maybe your name belongs here

This is your invitation to learn how calcium may help you in your chemical and metallurgical operations.

This highly reactive metal is not a tonnage product. Small amounts often work wonders. That is why its many uses, some of which are listed on the right, are not well known.

If these applications suggest ways you might use calcium, we shall be glad to have one of our metallurgical engineers assist you. Please write to our Technical Service Department in New York.

Typical Uses of CALCIUM

Magnesium • Improves surface properties of castings, and heat-treating characteristics of wrought products.

Stainless Steel • Deoxidizer for stainless and other steels that must be exceptionally clean and uniform.

Copper • Deoxidizer and cleanser.

Other Metals • Reducing agent in producing difficult-to-reduce metals . . . alloying agent in bearing metals, such as lead.

Chemical Uses • Absorbent for oxygen, hydrogen, nitrogen, and other gases . . . preparation of metal-organics for syntheses . . . dehydrating agent for alcohols and other organic chemicals . . . desulphurization of petroleum products.

ELECTRO METALLURGICAL COMPANY

Unit of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

Offices: Birmingham • Chicago • Cleveland • Detroit
New York • Pittsburgh • San Francisco

In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

Electromet
TRADE MARK
Ferro-Alloys and Metals

Who uses HYDRO-

That is a natural and business-like question for you to ask

Here's your answer . . . a list of distinguished names that makes further comment unnecessary

The Falk Corporation, Milwaukee
Nordberg Manufacturing Company, Milwaukee
Westinghouse Electric & Manufacturing Company, So. Philadelphia

Worthington Pump & Machinery Corporation, Harrison, N. J.
Clark Brothers, Olean, N. Y.
Gisholt Machine Company, Madison
Gould Pumps, Inc., Seneca Falls, N. Y.
Advance Foundry Company, Dayton

Carnegie-Illinois Steel Corporation, Gary
The Fairbanks Morse Company, Beloit
Kaukauna Machine Corporation, Kaukauna, Wis.
U. S. Naval Gun Factory, Washington, D. C.
Minster Machine Company, Minster, Ohio
Duplex Manufacturing & Foundry Company, Elyria, Ohio
E. Long, Limited, Orillia, Canada
Dominion Engineering Works, Ltd., Montreal

General Electric Company, Schenectady
Frick Company, Waynesboro, Pa.
Elyria Foundry, Elyria, Ohio
U. S. Navy Yard, Brooklyn
Toledo Machine & Tool Company, Toledo
Chicago Pneumatic Tool Company, Franklin, Pa
Fulton Iron Works, St. Louis
Greenlee Bros. & Company, Rockford

HYDRO-BLAST CABINET
efficient and economical for cleaning small castings with intricate cores or requiring particular finish.

HYDRO-

2550 NORTH WESTERN AVE.

-BLAST ?

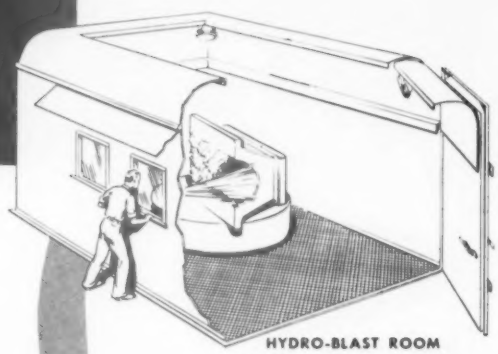
United Engineering Company, New Castle, Pa.
Kennedy-Van Saun Manufacturing & Engineering Corporation, Danville, Pa.

Crane Company, Chicago
Vancouver Engineering Works Ltd., Vancouver
Lynchburg Foundry Company, Redford, Va.

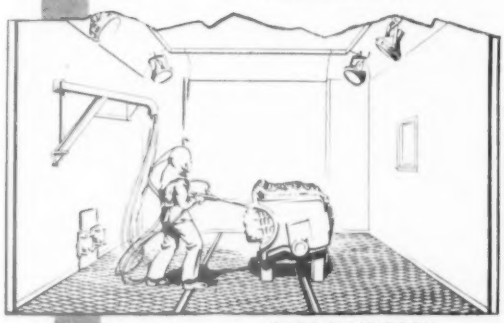
U. S. Navy, Pearl Harbor
American Manganese Steel Company, Chicago Heights, Ill.
The Black Clawson Company, Hamilton, Ohio
Cooper-Bessemer Corporation, Grove City, Pa.
Erie Forge Company, Erie, Pa.

Machined Steel Castings Company, Alliance, Ohio
Kutztown Foundry & Machine Corporation, Kutztown, Pa.
Cooper-Bessemer Corporation, Mt. Vernon, Ohio
National Transit Pumps & Machine Company, Oil City, Pa.
General Iron Works, Denver

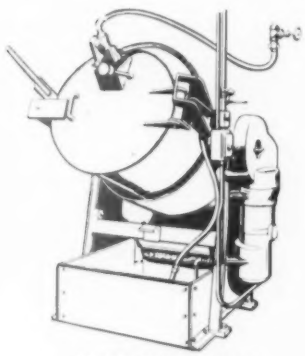
John Bertram & Sons, Dundas, Ontario
Otis Elevator Company, Yonkers
National Bearing Metals Division, American Brake Shoe Company, Meadville, Pa.
Pacific States Cast Iron Pipe Company, Provo, Utah
La Bour Company, Elkhart, Ind.
Erie Engine & Manufacturing Company, Erie
Standard Steel Works, Burnham, Pa.
Haynes Stellite Corporation, Kokomo, Ind.



HYDRO-BLAST ROOM
operator outside, using mechanically mounted blast equipment. Castings are mounted, as a rule, on a turntable.



HYDRO-BLAST ROOM
operator inside—usually the most efficient method in foundries producing deeply cored castings.



HYDRO-BLAST BARREL
effective and economical for cleaning small castings suitable for tumbling.

FOR FULL DETAILS CONCERNING LOW COST CLEANING OF CASTINGS, SAND RECLAMATION AND ELIMINATION OF DUST, WRITE FOR A CONSULTATION WITH HYDRO-BLAST ENGINEERS

-BLAST CORPORATION

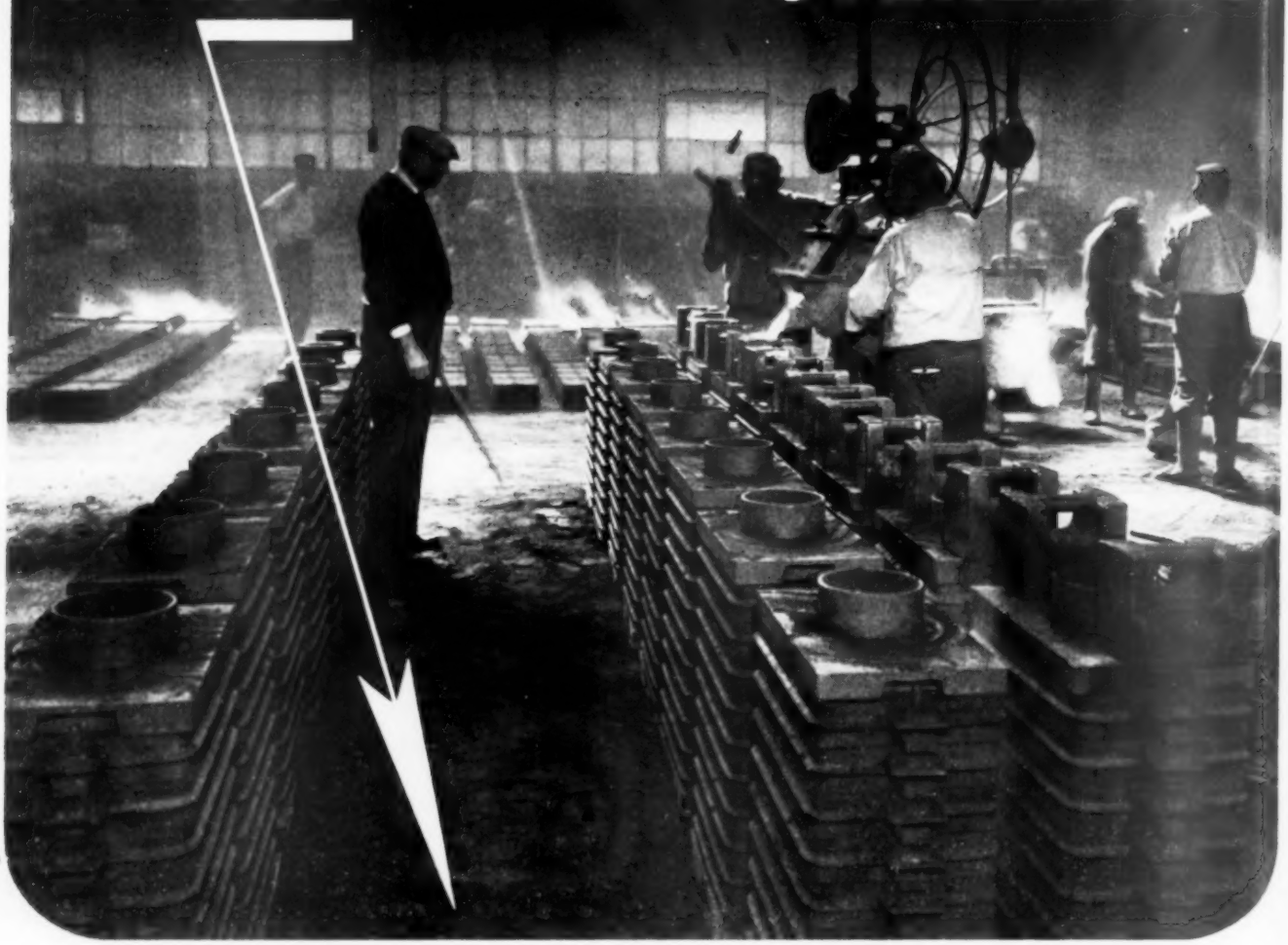
CHICAGO 47, ILLINOIS

FOREIGN REPRESENTATIVES

England—Pneulec Limited, Licensee, Smethwick (near Birmingham)
France and Switzerland—R. Dureuil, 4 Square Du Graisivaudan, Paris 17, France
Finland—Industria Osakeyhtio, Sodra Esplanadgatan 14, Helsingfors, Finland
Belgium—Charles Monseur, 195 Rue Saint Leonard, Liege, Belgium
Norway, Sweden, Denmark—Kollbye and Danielsen, Fridtjof Nansens Plass 6, Oslo, Norway

MODERN FOUNDRY PRODUCTION METHODS CALL FOR

STACK MOLDING WITH STERLINGS



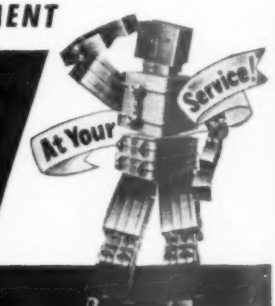
You can increase your foundry production now by stack-molding with Sterling Steel Flasks. This modern method of molding makes your foundry more efficient through greater job specialization, saves valuable floor space. Molds are made in flask sections stacked one above another, to a height of 10 to 12 sections, the exact number depending upon the depth of each section.

Sterling Steel Flasks are designed and built to withstand the tremendous pressure used by high-speed molding machines. They retain their rigidity and accuracy under constant production pressure. All types and sizes available to meet your requirements.

For faster, more efficient molding use Sterling's sturdy *rolled steel channel flasks.*

MORE THAN 4000 FOUNDRIES USE STERLING FOUNDRY EQUIPMENT

Sterling FOUNDRY FLASKS



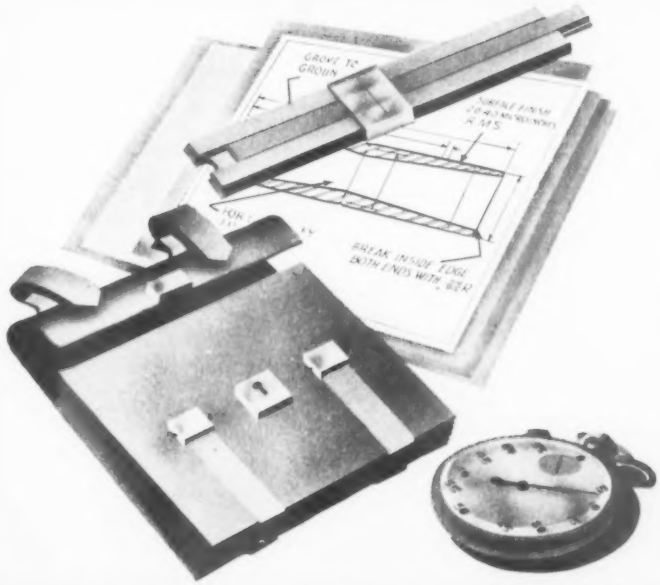
STERLING WHEELBARROW COMPANY • Milwaukee 14, Wis., U.S.A.

A 5358-1F

A BUYING GUIDE FOR ABRASIVES

ABRASIVE PROBLEM:
Is there a direct means for Solving Unusual Technical Problems?

ANSWER BY
CARBORUNDUM
TRADE MARK



When faced with unusual or difficult problems involving grinding, sanding or finishing . . . it is becoming the accepted practice of an increasing number of abrasive users to "Call in CARBORUNDUM."

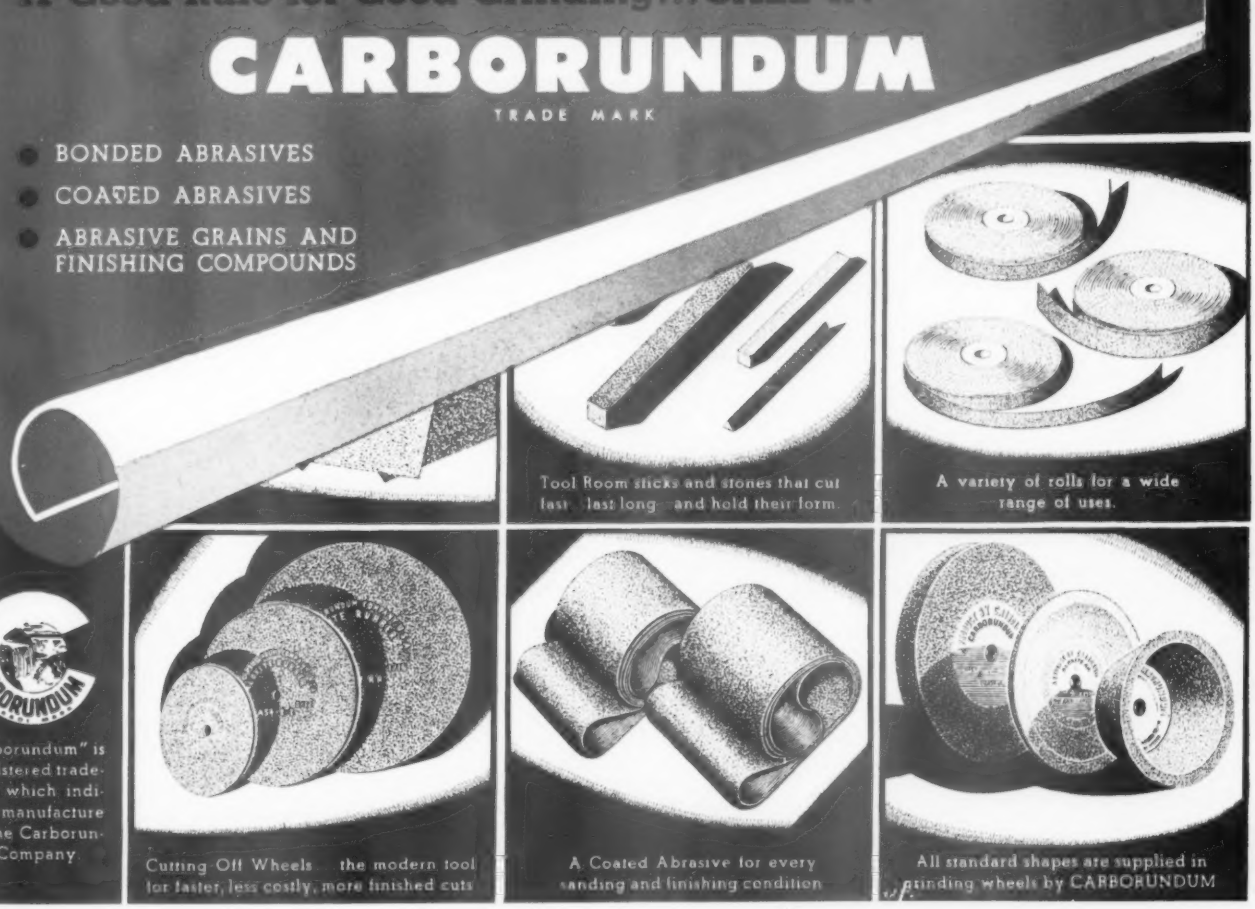
Our sales engineers are well equipped, through training and experience, to offer intelligent suggestions on specific abrasive applications and techniques. The information they pass on to both operators and production management is especially helpful. This is reflected in the preference expressed toward abrasives by CARBORUNDUM.

The Carborundum Company, Niagara Falls, New York.

A Good Rule for Good Grinding...CALL IN

CARBORUNDUM
TRADE MARK

- BONDED ABRASIVES
- COATED ABRASIVES
- ABRASIVE GRAINS AND FINISHING COMPOUNDS



Tool Room sticks and stones that cut fast . . last long . . and hold their form.

A variety of rolls for a wide range of uses.

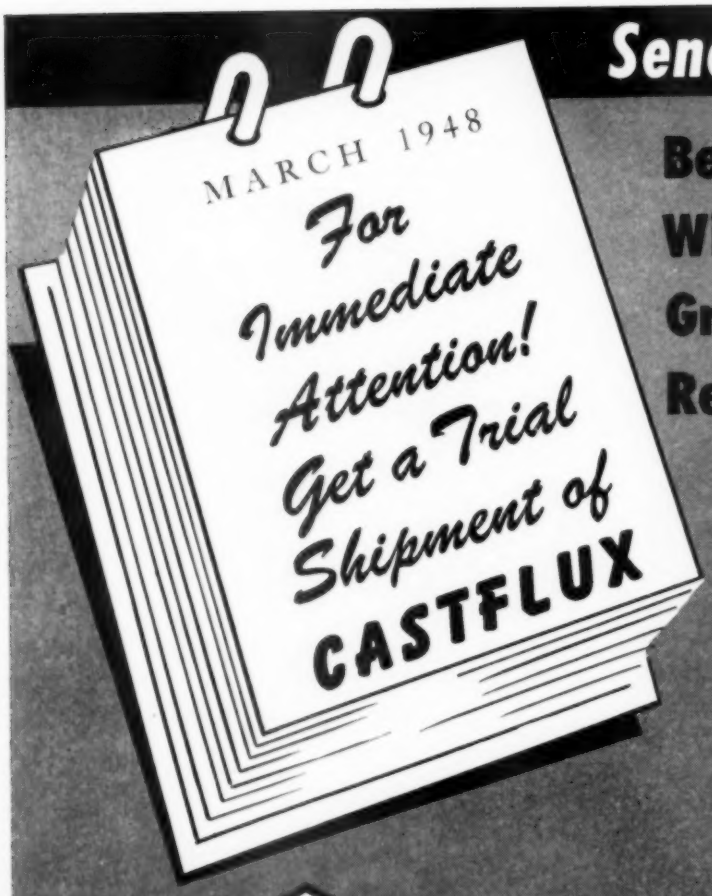
Cutting Off Wheels . . the modern tool for faster, less costly, more finished cuts

A Coated Abrasive for every sanding and finishing condition

All standard shapes are supplied in grinding wheels by CARBORUNDUM

"Carborundum" is a registered trademark which indicates manufacture by The Carborundum Company

Send That Order Now!



Be Convinced That You Will Get Better, Closer-Grained Castings, Fewer Rejects, Less Miss Runs

at the Small Cost of

6¢ to 10¢ per ton

of Metal Treated!

What Castflux costs is insignificant compared to the overall savings effected by this remarkable scientific compound.

CASTFLUX TRADE MARK REG.

is the Dual Purpose Flux

BECAUSE

1. ON BOTH BLIND and OPEN RISERS . . .

it raises the temperature of the metal to a much higher degree and substantially increases and maintains the fluidity of the metal during the entire cooling-down period.

2. IN THE LADLE . . .

Castflux cleanses and purifies the metal, bringing to the surface occluded oxides, gases, slag, dirt, and other foreign matter, offsetting the negative factors of inferior scrap and coke.

CASTFLUX *is sold on this* **UNCONDITIONAL GUARANTEE . . .**

Unless our representations are proven within 30 days after receipt of material, it can be returned at no expense to you.

NATIONAL

PIGMENT COMPANY

2115-2117 E. YORK ST., PHILA. 25, PA.

Sales Agencies Throughout the U. S. A. and Abroad

What OXYGEN Supply Will Be Used In Steel-Making Furnaces?

EXPERIENCE ALREADY GAINED shows that there will probably be more than one form of oxygen supply required for steel-making furnaces, when this product comes into regular use in making steel.

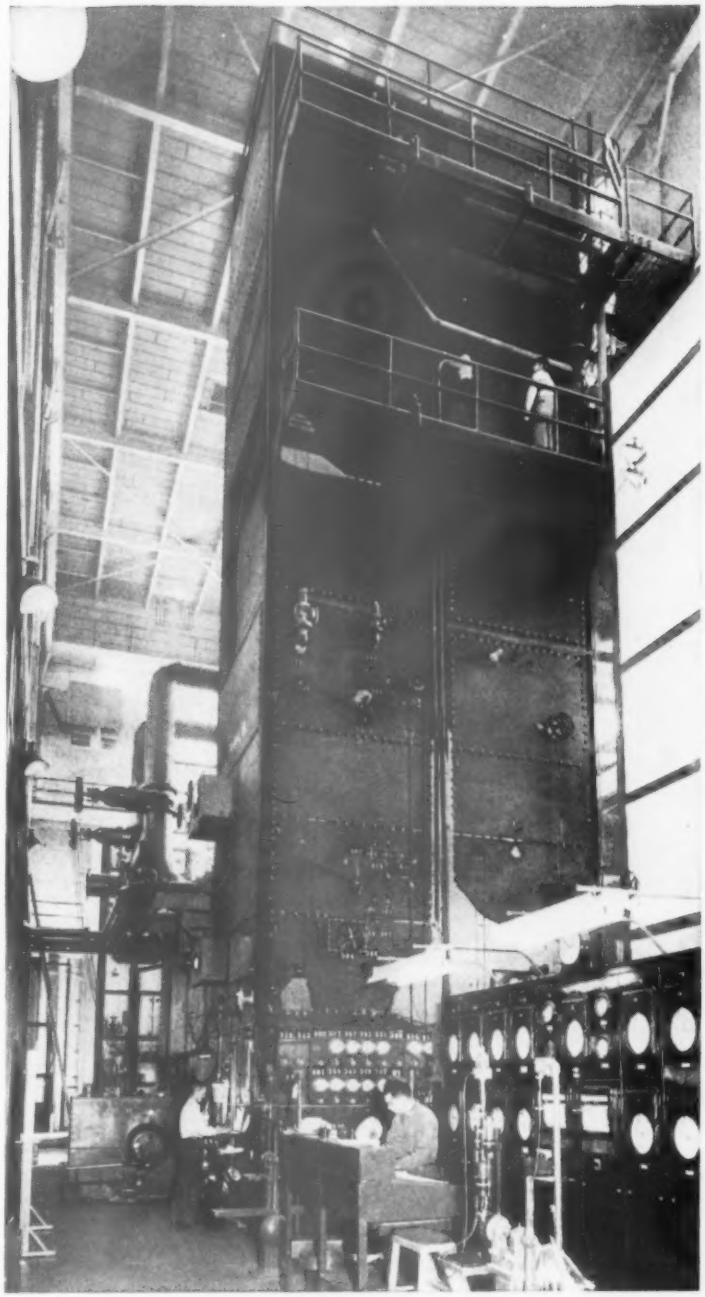
DATA FROM 8,000 HEATS, USING OXYGEN, run in 15 steel mill and furnace shops with which LINDE has been co-operating already have served to dimension the problems of furnace operation with oxygen. Meanwhile, consumption of oxygen per ton of steel has been reduced to a fraction of that frequently used a year ago to accomplish the same results.

This work has shown that some mills may accomplish much of the speed-up of furnace operation with *compressed air*—combined with some use of *high-purity oxygen*. In other mills, the operating practice and type of products made may call for a steady flow of tons of *low-purity gaseous oxygen* each day.

LINDE'S DRIOX liquid oxygen system long since has proved to be the obvious answer wherever substantial volumes of high-purity oxygen are required, and wherever dependability and flexibility of the system of supply are of prime importance.

Anticipating the demands for any desired quantity of low-purity oxygen, LINDE has had its huge low-purity oxygen plant in pilot operation for more than a year. This plant is an achievement resulting from 40 years experience in oxygen manufacture, and 15 years experimentation with low-purity units.

Steel mill management is thus in a position to benefit, regardless of the quantity or purity required, from LINDE's long-demonstrated experience with both *high-purity* and *low-purity oxygen* production—and outstanding success in saving money for its customers in any oxygen-using process.



The largest single column for producing gaseous oxygen ever constructed—200 tons per day of 90 per cent purity. First operated more than a year ago.

LINDE service engineers, through their experience with oxygen-using processes, can be of real assistance to you in studying the problems associated with obtaining increased production from the use of oxygen at your plant. Contact the nearest LINDE office.

Linde Trade-Mark

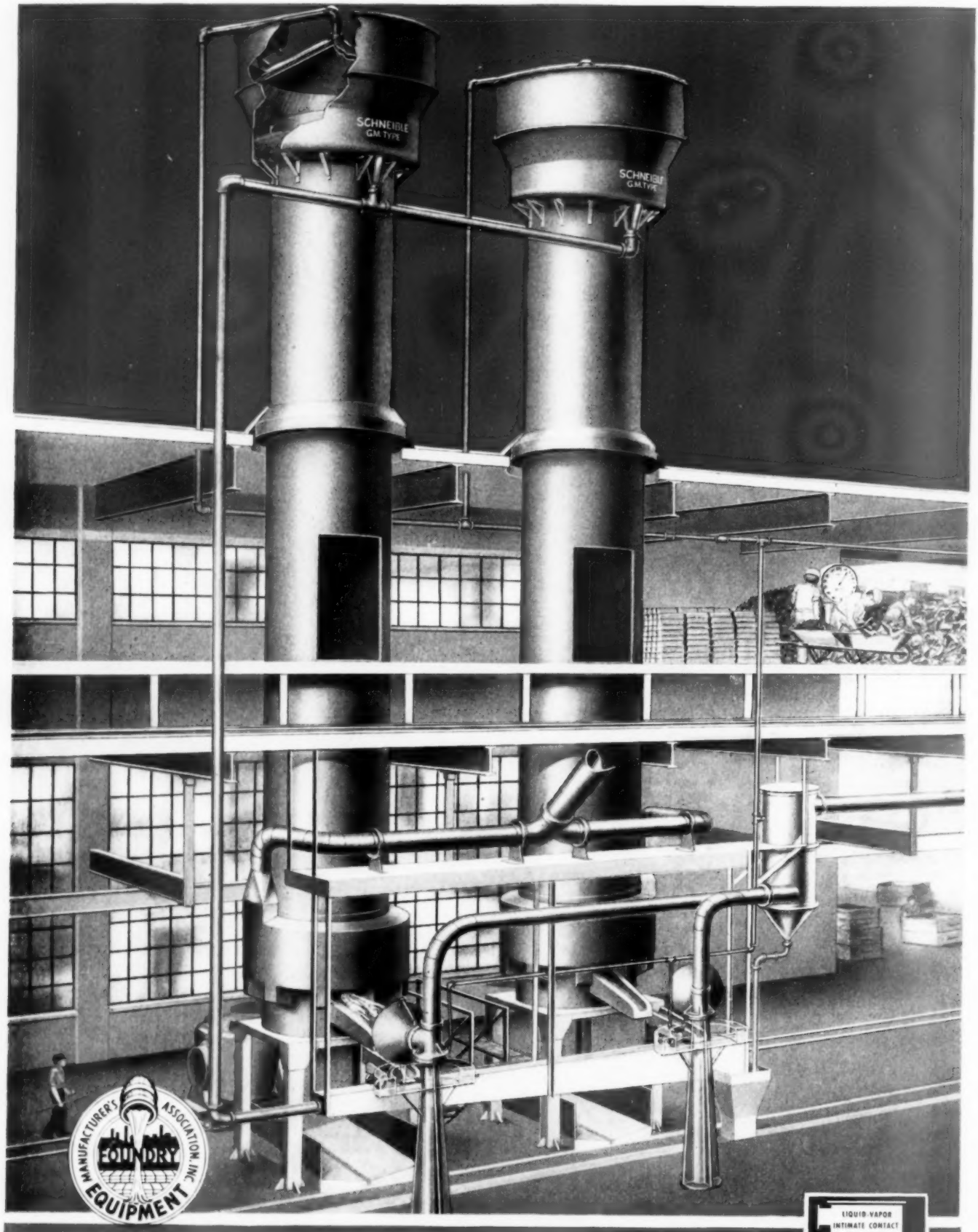
THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

30 E. 42nd St., New York 17, N. Y. UCC Offices in Other Principal Cities

In Canada: DOMINION OXYGEN COMPANY, LIMITED, Toronto

The words "Linde" and "Driox" are trade-marks of The Linde Air Products Company



SCHNEIBLE

LIQUID-VAPOR INTIMATE CONTACT EQUIPMENT for DUST COLLECTION ABSORPTION CONDENSATION AND TEMPERATURE REDUCTION

Clean Air in the -Zone and

Clean up your Melting Department As Well!

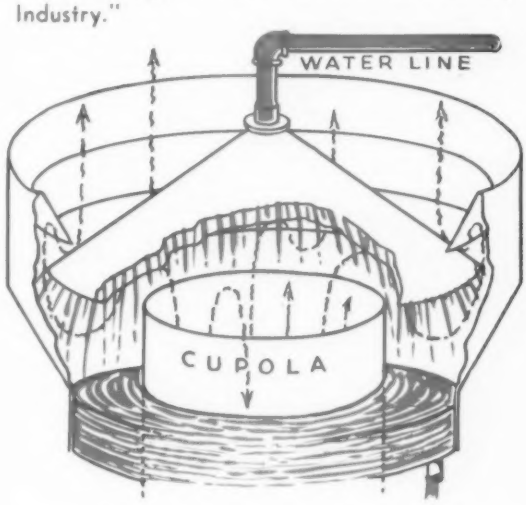
Schneible cupola refuse collecting and handling equipment is unique in providing clean up equipment for every phase of the cupola operation and consists of:

1. **"G M" Type Cupola Collector**
   Collects cupola cinders, metal particles, etc. from cupola stack.
2. **Funnel Type Slag Wool Collector**
   Collects slag, cinders and mineral wool from blow of slag holes.
3. **Slag Quench Trough**
   Quenches slag in water, breaks it into small particles easily handled from slag spout.
4. **Refuse De-Watering Tank**
   Proper size and type to suit your need; settles all refuse and permits re-use of water.

Water for the entire comprehensive system may be recirculated. Normally the water used to collect the cupola stack refuse is dropped by gravity to serve the slag quench trough. Likewise, the water and refuse from the mineral wool collector drops into the slag trough.

The system is simple and easily operated, with minimum maintenance.

The "know how" gained from many installations assures the success of your system. Send for your copy of "Schneible In the Foundry Industry."



The water used for collecting and conveying away the collected material also cools the hood over stack.

CLAUDE B. SCHNEIBLE CO.
2827 Twenty-Fifth St., Detroit 16, Mich.
Engineering Representatives in Principal Cities

COPYRIGHT 1948

Look to Schneible for Important Developments in 1948

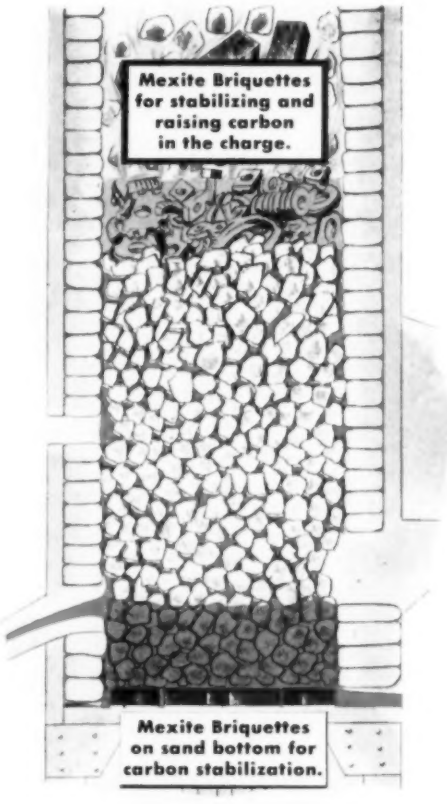
MEXITE BRIQUETTES LICK PIG IRON SHORTAGE IN EASTERN FOUNDRY

The Eastern Foundry Company Uses Mexite Briquettes and No. 8 Mexican Graphite to Produce Better Quality Castings at Lower Cost.

Pig iron shortages don't worry The Eastern Foundry Company of Boyertown, Pa. They use Mexite Briquettes in their cupola charges — 4 Briquettes per 2,000 lb. charge with 25% pig iron — and they're getting better carbon control and more fluid iron than before. That's because *one 4-lb. Briquette yields as much carbon as 50 lbs. of pig iron,* and also improves fluidity, cuts shrinkage and chill, and greatly aids melting. Because of these advantages, the foundry plans to increase the number of Mexite Briquettes per charge and reduce the pig iron content to 15% while still maintaining the proper carbon balance between 3.35 and 3.45%.

In addition to Mexite Briquettes, Eastern Foundry uses No. 8 Mexican Graphite as *a low-cost ladle addition* to give exact con-

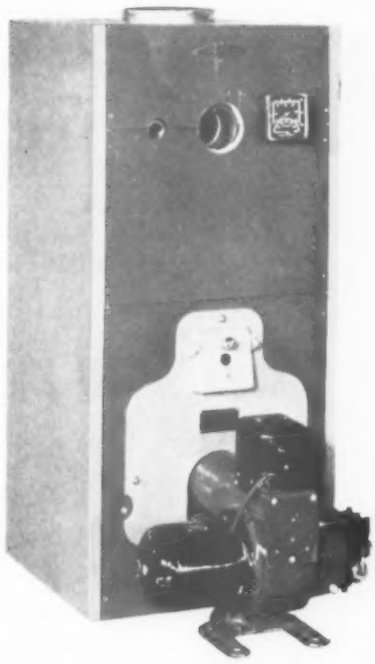
Mexite Briquettes are easy to use by simply tossing into the charging door.


Mexite Briquettes for stabilizing and raising carbon in the charge.
Mexite Briquettes on sand bottom for carbon stabilization.

THE UNITED STATES GRAPHITE C

trol of chill and assure castings of increased machinability.

The experience of Eastern Foundry with Mexite Briquettes and No. 8 Mexican Graphite is not unusual. Foundries everywhere *are lowering costs and improving the quality of their castings* with these and other of our Mexican Graphite products for foundry use. We will be glad to analyze your charging and melting problems and recommend the specific products that will give you better results for less money. *Write for complete particulars.*



Peerless boiler having cast sections which demand close carbon control — one of the products of Eastern Foundry.

THE EASTERN FOUNDRY COMPANY

"EAFCO" SOIL PIPE & FITTINGS, PLUMBING SPECIALS & CASTINGS, PEERLESS COAL GAS OIL STOKER & WATER SUPPLY BOILERS

Boyertown, Pa.

November 26, 1947

The United States Graphite Company
Saginaw, Michigan

Gentlemen:

We want you to know how pleased we are about your Mexite Briquettes for carbon control in our cupola. When pig iron became hard to get, we were worried about maintaining the accurate carbon control of the high quality castings which we demand to insure production of the high quality castings made in our foundry. After using your Mexite Briquettes for several months we are no longer concerned about pig iron shortages. Your product has enabled us to maintain even better carbon control and more fluid iron.

We are enclosing a picture of one of our products, the Peerless Boiler, having cast sections which demand close carbon control. We also make soil pipe and fittings, sheaves, etc., and the iron must be fluid to run into these sections properly. We use 4 Mexite Briquettes per 2,000 pound charge with 25% pig iron, and are planning to reduce the pig iron to 15% and use more Mexite to maintain the proper carbon balance which we hold between 3.35 and 3.45% C.

For years we have used your No. 6 Mexican graphite as a graphitizing inoculant and wouldn't be without it to reduce chill and hardness, and improve machinability.

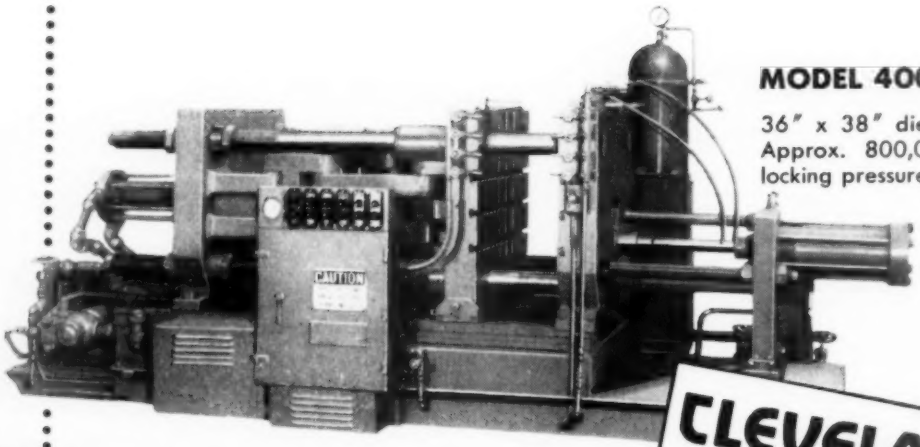
Your Mexite Briquettes should prove a valuable aid to any foundry, especially during these times when carbon control and carbon raising must be accomplished with less pig iron.

DGB:KR

Yours very truly,
Dan Bergert, President
THE EASTERN FOUNDRY COMPANY
Boyertown, Penna.

Mexite Briquettes, analyzing 70% Mexican Graphite, are 8" x 4" x 2" and weigh approximately 4 lbs. each.

COMPANY • SAGINAW, MICHIGAN

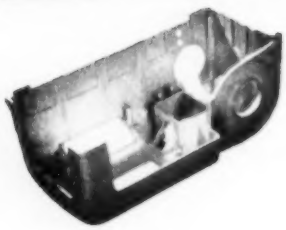


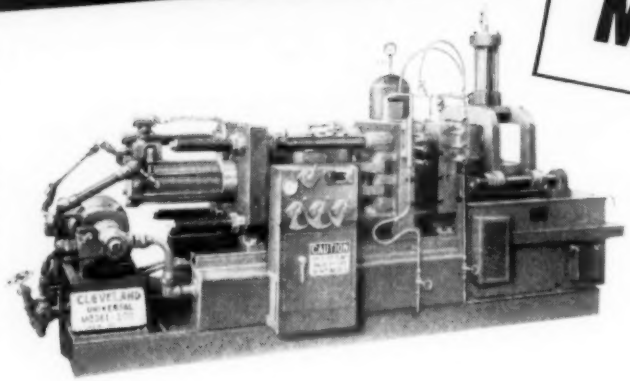
MODEL 400

36″ x 38″ die plates. Approx. 800,000 lbs. locking pressure.

BETTER CASTINGS → FASTER at LESS COST

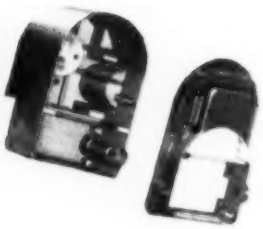
CLEVELAND DIE CASTING Machines





MODEL 200

27″ x 27″ die plates. Approx. 400,000 lbs. locking pressure.



Here are two universal high-pressure hydraulic die casting machines, *Cleveland-Built* for high production of quality castings. Heavy, rigid construction—welded, flame-cut steel plates—resists shock and strain, prevents stretch and distortion. Dies are held in accurate alignment, producing precision castings with minimum flash.

Cleveland design gives you easy access to dies; ample die area; sure-fire shot mechanism; flaw-proof quality of hot metal; rapid and positive core pulling and ejection; safe and simple control—either manual or full automatic. Simply changing hot metal ends converts both Cleveland models from zinc, tin or lead casting, to aluminum, brass or magnesium casting.

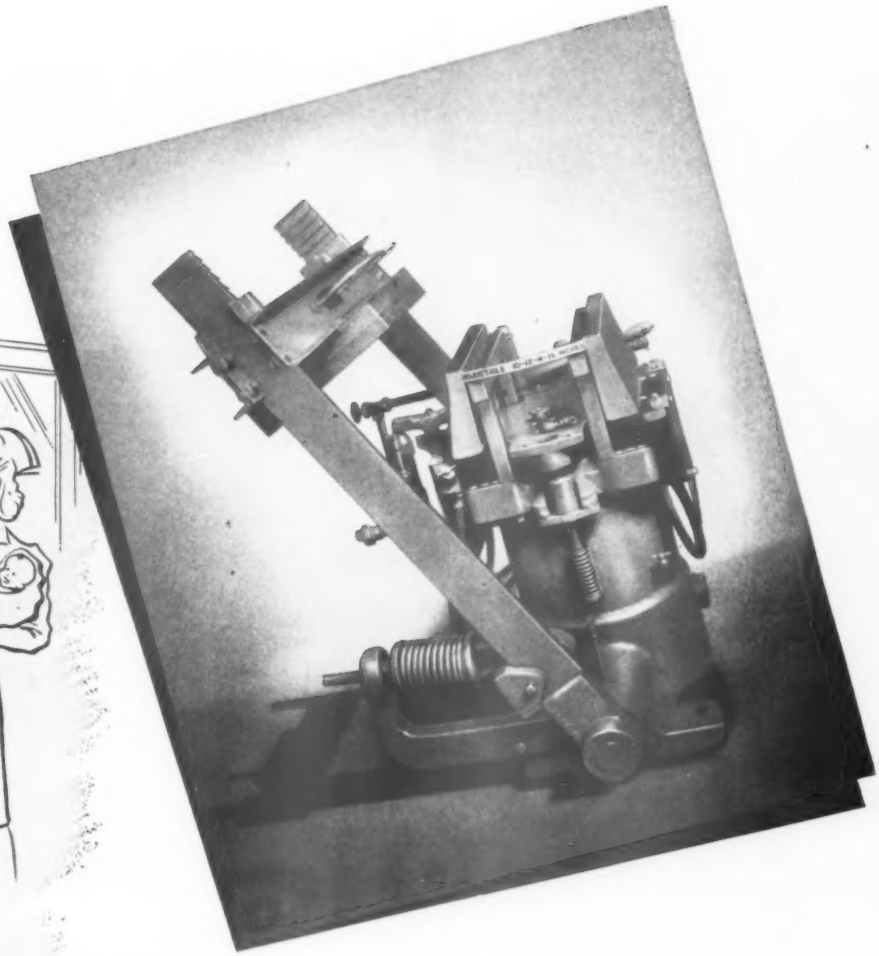
With both models working as your casting production team, Cleveland engineering further reduces costs. Construction on both models permits the maximum amount of interchangeability; platen and die plate T-slots are identical in size and location; goosenecks, nozzles, plungers, sleeves, etc., are interchangeable.

Let a Cleveland engineer show you the advantages these machines can bring to your die casting production. Send us details of your work. For complete machine specifications, write for bulletins.

THE CLEVELAND AUTOMATIC MACHINE COMPANY

4926 BEECH STREET • • CINCINNATI 12, OHIO

CHICAGO (6) 3710 Civic Opera Bldg. CLEVELAND (14) 1114 NBC Bldg. DETROIT (2) 540 New Center Bldg.
HARTFORD (1) 529 Capital National Bank Bldg. NEW YORK (6) 2402 Singer Bldg.



IT DELIVERS WHAT FOUNDRYMEN EXPECT

QUALITY molds and more of them—long life—low upkeep—flexibility that puts the machine "at home" in either production or jobbing shop . . . that's the story with this Tabor Yoke-type Jar-squeeze Flask-lift machine.

Design is the answer! Pattern plate supports and flask-lift sides keep a proper relation between pattern plate and flask surfaces. This means a "sand seal" when the mold is closed. Finning is eliminated . . . savings result.

Tolerances are so close that the match on the castings will depend only on the alignment of patterns.

In addition to its high-production features, this machine is flexible. Its 13" cylinder delivers a uniform squeeze — a smooth 4" draw. Adjustable open-end frame takes pattern plates 10" to 16" wide, at lengths limited only by the 260 sq. in. plate area. Also available with column- or cantilever-type head.

Write today for Bulletin #451 describing this worthy member of the Tabor family—a line of molding machines and allied foundry equipment built to *deliver* what foundrymen *expect.*

REPRESENTATIVES
Snyder Foundry Supply Company, Los Angeles, California; Carl F. Miller & Company, Seattle, Washington; M. W. Warren Coke Company, 1017 Olive St., St. Louis 1, Mo.; E. R. Frost Co., Inc., Minneapolis 14, Minn.

MANUFACTURERS' ASSOCIATION INC. FOUNDRY EQUIPMENT

The TABOR Manufacturing Co.

SINCE 1884 MANUFACTURERS OF FOUNDRY MOLDING MACHINES
6225 TACONY STREET • PHILADELPHIA 35, PENNA.

12"-38" ADAMS JOLT SQUEEZER—PORTABLE TYPE

Keep Up With Production Schedules

Reduce Operating Costs . . .

SIZES AND TYPES FOR ANY SQUEEZE MOLDING REQUIREMENTS

Side Rod Type and Post Type—Jolt Squeeze and Jolt-Squeeze—Pattern-Draw-Styles—Stationary and Portable-Hand Squeezers. Write today for full details in Catalog No. 705. THE ADAMS COMPANY, 700 Foster St., Dubuque, Iowa.

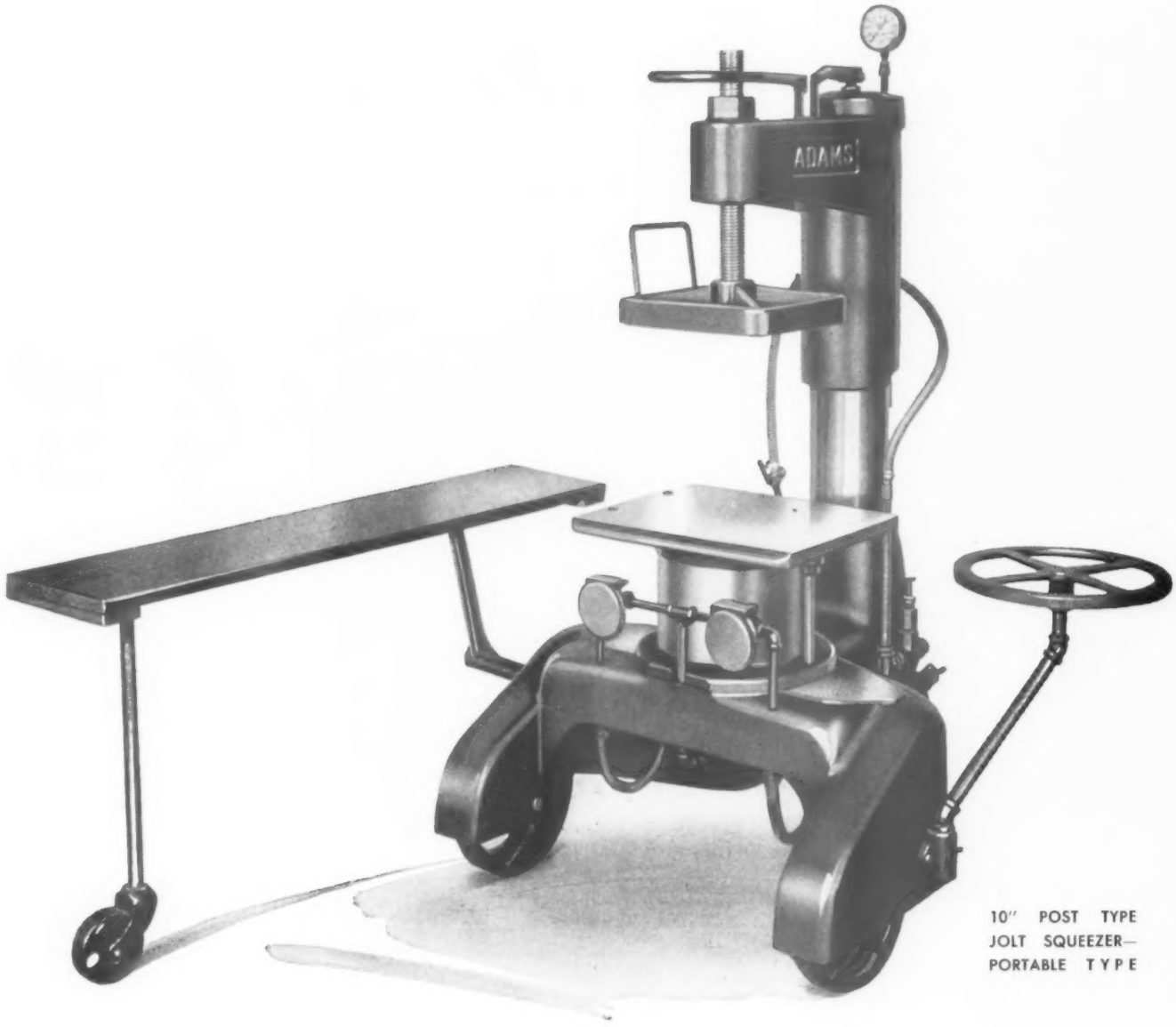
With Adams

All-out production—You'll get just that with Adams fast, accurate molding machines—and at lower costs! Their speed, stamina and power, plus simplified design for easy operation, help maintain steady, high output levels even with unskilled labor. Losses are limited by the close control of

THE ADAMS

DUBUQUE,

MOLDING MACHINES . . . . . FLASK



10" POST TYPE
JOLT SQUEEZER—
PORTABLE TYPE

Molding Machines

jolting and squeezing operations which assure accurate, uniform molds.

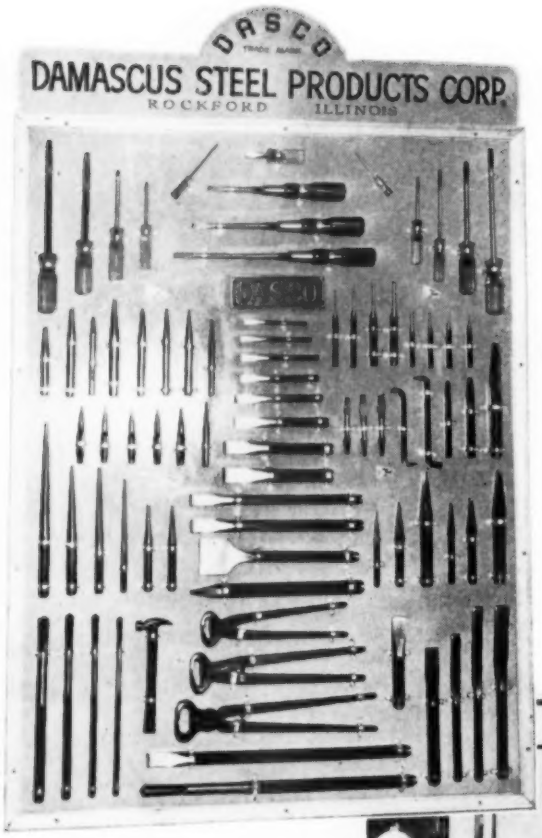
Here are some of the features that lower production costs—Minimum working parts, protected against sand and dust—convenient, accessible operating controls for quick handling—great flexibility—low maintenance costs. Adams molding machines give dependable, long term service. They stand up to the pressures of high production, maintaining their efficiency and accuracy throughout prolonged hard use.

COMPANY

IOWA, U.S.A.

EQUIPMENT . . . . . Established 1883

GAS Keeps Production Moving in Heat-Treating Processes



Some of the precision heat-treated tools manufactured by DAMASCUS STEEL PRODUCTS CORP.

Section of the heat-treating department with close-up view of the simple Gas-fired furnace used for a wide-range of heat-treating operations on small tools. Photos courtesy the Eclipse Fuel Engineering Co., Rockford, Ill.

When your heat-treating process impedes real production-line operation you can take a tip from the metallurgists and engineers at Damascus Steel Products Corporation, Rockford, Illinois, and install flexible Gas Equipment right where you want it.

These engineers had a very real problem—a great variety of products each requiring a different time-temperature cycle for heat-treating. But, after a series of tests and investigations they chose GAS and a Gas-fired lead pot furnace.

With this Gas-fired furnace installed right in the production-line, and with automatic GAS controls, heat-treating was reduced to a simple, fool proof operation. As a result, Damascus Steel Products have an absolutely uniform hardness pattern, while production has increased and cost has been reduced.

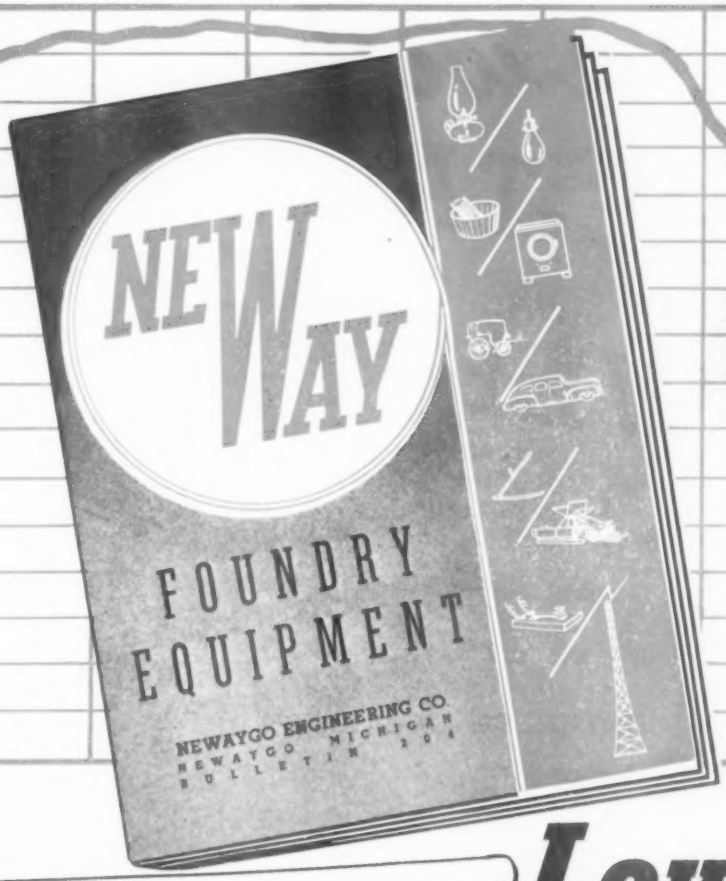
Most important, however, is the fact that this one Gas-fired furnace performs all the heat-treating operations with the simple adjustment of time and temperature controls—and without requiring special and costly accessory equipment.

Wherever you require heat for industrial processing there's a job for GAS. That's where your local Gas Company Representative can be really helpful.

MORE AND MORE...
THE TREND IS TO GAS
FOR ALL INDUSTRIAL HEATING

AMERICAN GAS ASSOCIATION
420 LEXINGTON AVENUE, NEW YORK 17, N. Y.

1944 1945 1946 1947 1948 1949 1950 1951



GUIDE to Lower Costs!

FOLLOW IN THEIR FOOTSTEPS

Here are some of the well known companies that have pre-proved the value of New Way foundry equipment for you:

Allis-Chalmers Mfg.Co.
Cooper-Bessemer Co.
Covel Foundry Co.
Crane Company (Port Hope Sanitary Div., Ont., Can.)
Detroit Stoker Co.
Dow Chemical Co.
Ford Motor Co.
General Malleable Corp.
Grand Haven Brass Foundry
Henry Furnace Co.
Homestead Valve & Mfg. Co.
Humphryes Mfg. Co.
Ingersoll-Rand Co.
Kelsey-Hayes Wheel Co.
Nash-Kelvinator Co.
National Radiator Co.
National Motor Castings Div. Campbell, Wyant & Cannon Foundry Co.
National Transit Pump & Machine Co.
Nylen Products Co.
Pacific States Cast Iron Pipe Co.
Osgood Co.
Pufahl Foundry, Inc.
Penn Steel Castings Co.
Richmond Radiator Co.
Sealed Power Corp.
Standard Buffalo Foundry Co.
U. S. Radiator Co.
United States Rubber Co.
Wehr Steel Company
Wilkening Mfg. Co.
Wolverine Brass Works

The New Way Foundry Equipment Bulletin

Get the proof in advance . . . see how "New Way" equipment is pushing the cost curve down to bring a new profit margin to foundries everywhere. Bulletin 204, just off the presses, will give you straight-from-the-shoulder answers to some of your most difficult problems . . . will show you how the "New Way" is the way to speed up operations, conserve manpower, reduce sand waste, cut casting losses.

You'll find equipment that's "just what you need" in the fully illustrated and described line which includes:

Aerators
Conveyor Belt Takeups
Core Crushers
Core Drawing Machines
Mold Conveyors
Magnetic Belt Conveyors
Rotary Plate Feeders
Sand Gates
Sand Handling Systems
Turntables
Elevators (Bucket)
Belt Conveyors

Put Bulletin 204 on your "must" list of foundry literature for 1948. Send for your copy today.

NEWAYGO ENGINEERING CO.

NEWAYGO, MICHIGAN

THE New Way LINE
Sand handling, cooling and conditioning equipment, mold conveying systems, reclaiming units, rapless core drawing machines.

• OFFICES IN ALL PRINCIPAL CITIES •

Blow Intricate Cores...

Faster with a

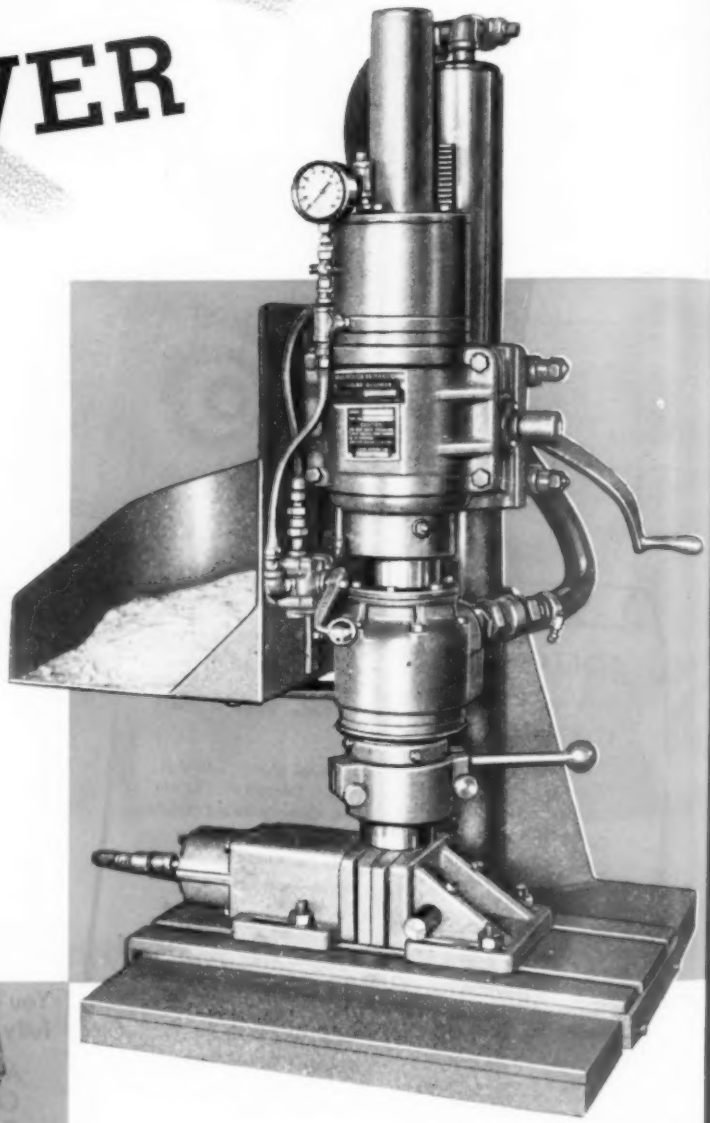
MILWAUKEE-TACCONE

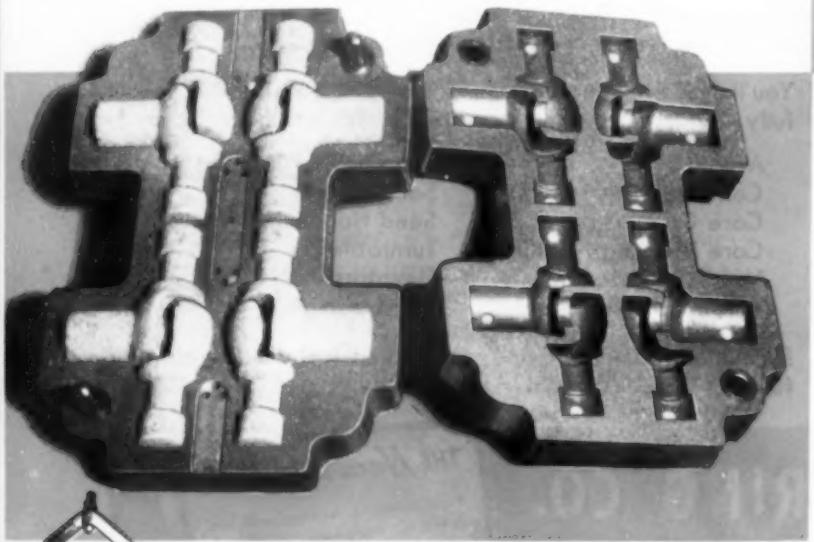
Explosion Type

CORE BLOWER

You can blow more intricate cores and blow 'em faster with a Milwaukee-Taccone Bench Type Core Blower. An even, quick blast of air readily blows the most difficult cores. A pressure cylinder steps up the line pressure from 90 lbs. to 120 lbs. blowing pressure and assures steady pressure to produce quality cores. The powerful pneumatic vise and neoprene bonded plate provide a tight, fast blow.

The effortless operation of the quick opening valve and the explosion type blow enable the operator to blow cores as fast as they can be placed into position and removed. The synchronized action of clamping and blowing the core simultaneously, provides greater speed and a high degree of efficiency. Once the core is blown it is automatically released for removal by the operator.





A Sturdy, Precision-Built Machine, for Long Trouble-free Service

The Milwaukee-Taccone Core Blower will blow either horizontal or vertical split cores. It blows cores up to 3 lbs. in size. The moderate purchase price and low maintenance cost make it a desirable machine for foundries of all sizes.

MILWAUKEE *Foundry Equipment Co.*

3238 W. PIERCE STREET, MILWAUKEE 4, WISCONSIN, U.S.A.

DON'T GAMBLE WITH *Accuracy*

MILWAUKEE JOLT SQUEEZERS

. . . Give you a Solid Impact Jolt and Maximum Squeeze Pressure at All Times

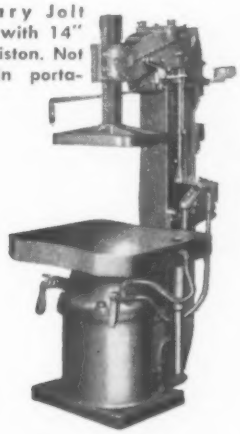
Why take chances producing ram-offs in your molding operation? Ram-offs are impossible with Milwaukee Jolt Squeezers. The arm has direct contact with the back frame when pressure is applied squaring up the platen with the table. The squeeze valve is on the arm for safe and convenient operation. The jolt and vibrator valves are knee operated. Simple in design . . . ruggedly constructed . . . and machined to close tolerances . . . these dependable Jolt Squeezers enable you to produce BETTER MOLDS in LESS TIME. Compare them, point for point, with any other Jolt Squeezers on the market.

New Bulletin No. 118

Just off the press. Gives complete description and specifications of Milwaukee Jolt Squeezers. Send for your copy.

No. 142JS

Stationary Jolt Squeezer with 14" squeezing piston. Not available in portable type.



No. 103

Stationary Jolt Squeezer with 10" squeezing piston. Accessible from 3 sides.

No. 124

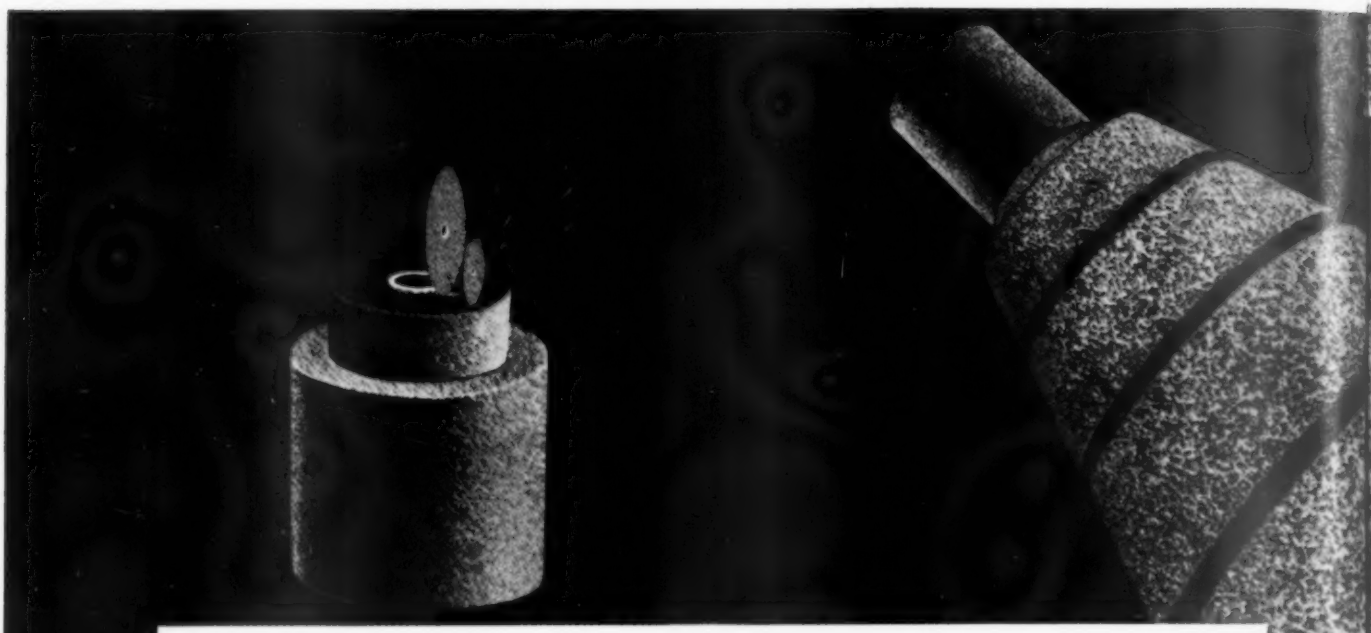
Portable Jolt Squeezer with 12" squeezing piston, steel wheels and mold shelf.

PROMPT SHIPMENT

. . . of 10" and 12" Sizes

MILWAUKEE *Foundry Equipment Co.*

3238 W. PIERCE STREET, MILWAUKEE 4, WISCONSIN, U.S.A.



"Spark" your production with custom-made grinding wheels

Put new spark—new life and speed—into your grinding operations with custom-made Peninsular grinding wheels.

Job-designed, Peninsular wheels are just *the right* abrasive, bond and grade for your specific jobs. That means less loading and dressing, greater stock removal and better finishes . . . faster, more efficient grinding for you with Peninsular wheels.

Let Peninsular engineers show you how to boost your production. Let them make —at no cost to you—a careful, exhaustive examination and analysis of *all* the factors that influence your grinding. They will then recommend and develop for you wheels custom-tailored to your grinding needs. This Peninsular service has boosted production and lowered costs in over 50 fields since 1889.

For a free analysis of your grinding operations, call in a Peninsular Engineer. Contact any Peninsular Sales Office—or write:

The Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit 7. Sales Offices: Chicago, Philadelphia, Boston, Buffalo, Cleveland, Pittsburgh, Houston, St. Louis, Cincinnati.

PENINSULAR

INDIVIDUALLY PENINSULAR *ENGINEERED*

GRINDING WHEELS

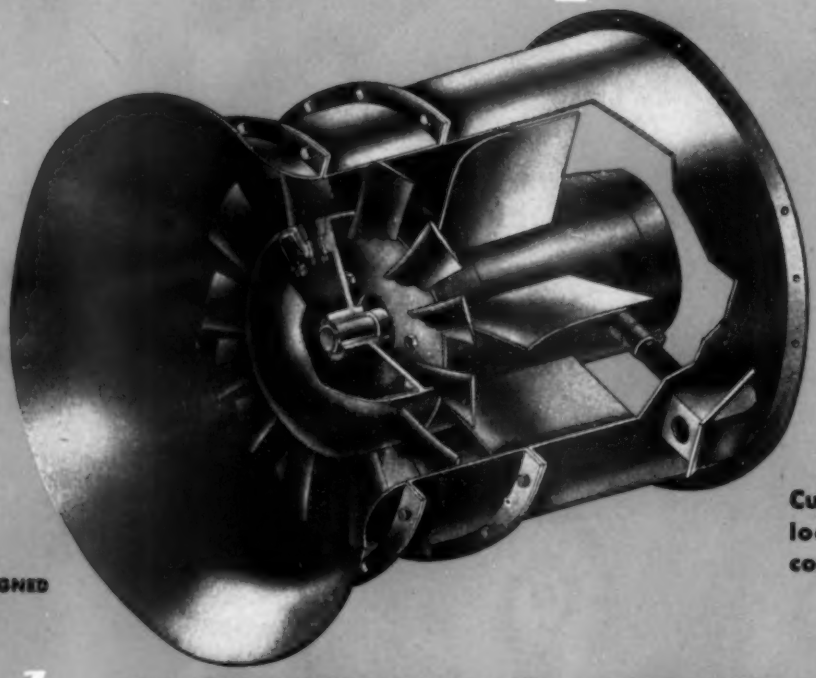
SINCE 1889

SPECIALISTS IN RESINOID BONDED WHEELS

This Peninsular spark plug is made from various-sized tapered cups and straight-sided wheels.

NOW AVAILABLE

a Fan of outstanding Engineering, Construction and Performance Superiority



TROLLER DESIGNED

Cutout drawing showing location of motor and compact fan construction

the "SERIES 1000"

JOY AXIVANE FAN

A stock line of Vaneaxial Fans with an unequalled range in volume and sizes.

Volumes up to 100,000 C. F. M.
Pressures up to 9.6" W. G.
Housing diameters 18" to 60"

And the added advantage of on-the-job ADJUSTABLE BLADES to meet changing volume and pressure demands. Write for descriptive Bulletin.

W&D 1-1486

Consult a Joy Engineer

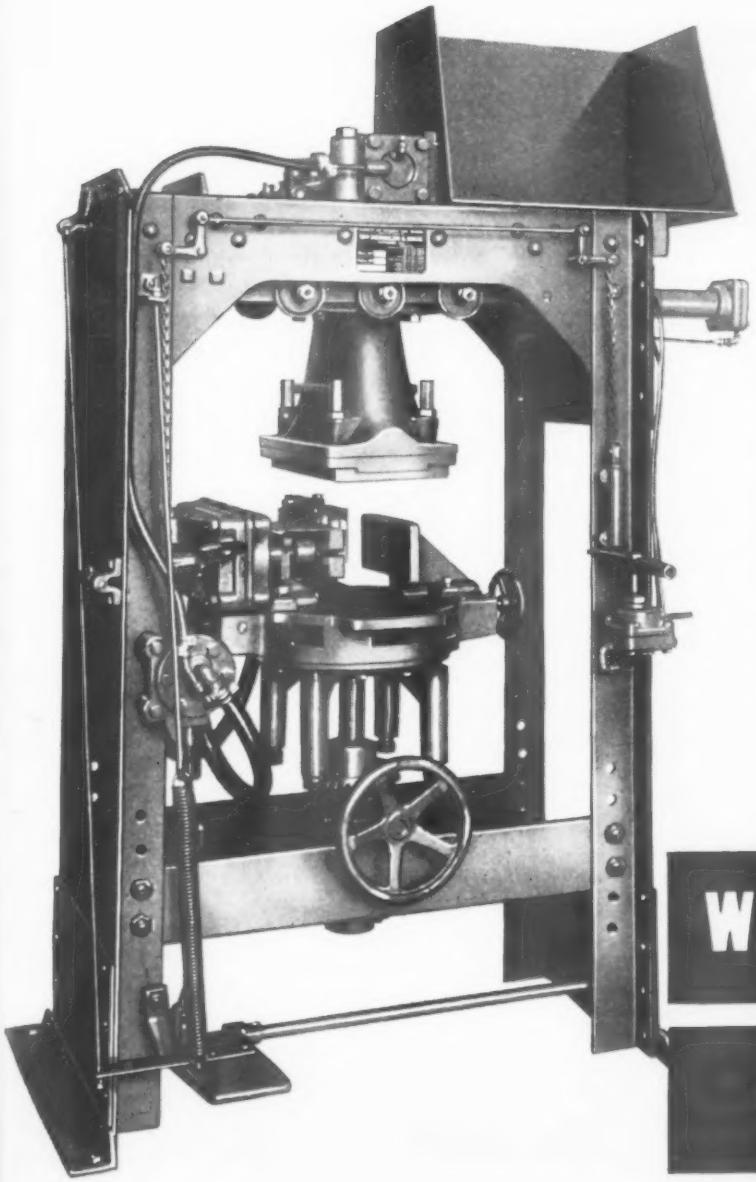
JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

VERSATILE!

The No. 1 Demmler

General Purpose Core Blowing Machine



The DEMMLER No. 1 general purpose Core Blower is a popular machine because it is a profitable machine to own.

Its versatility in blowing both small and medium size quality cores at a high rate of speed with maximum economy, coupled with its modest price and rugged dependability, has made it the leader in its field.

The machine is built on a rugged structural steel frame, has a productive capacity of about 200 core boxes per hour and is available with several different sizes of sand magazines. Job changes in from five to ten minutes are easy because hand wheels quickly raise and lower the chuck table and make the proper chuck jaw adjustments. The clamping, blowing and releasing operations are performed in less than four seconds.

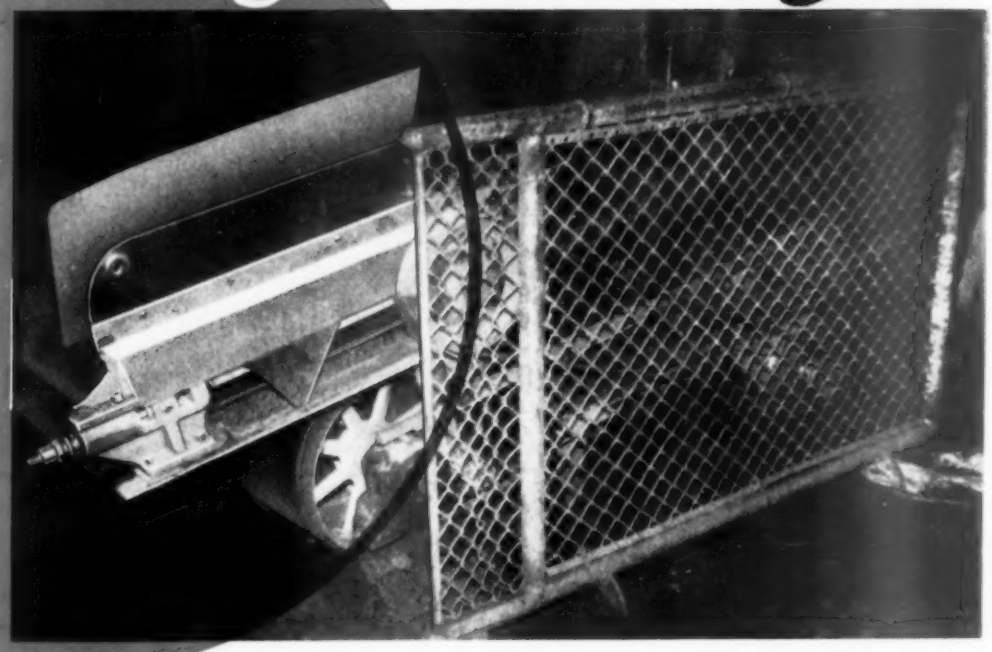
For general-purpose small and medium core blowing work, choose the DEMMLER No. 1—the core blower with an unchallenged reputation for dependable, profitable performance.

WRITE FOR ILLUSTRATED FOLDER TODAY!

Wm. Demmler & Bros.

KEWANEE, ILLINOIS

2 Jobs for this Royer



at Oklahoma Steel Castings Co., Inc.

LOADER and AERATOR . . . a Royer Sand Separator and Blender gets a "2-jobs-at-once" assignment in the progressive electric steel castings plant of the Oklahoma Steel Castings Co., Inc., Tulsa. Always on the lookout for new methods of increasing and improving production of small and medium weight castings for oil and affiliated industries, this company found the Royer ideal for transferring backing sand from mill to conveyor belt.

(1) LOADER—as shown in the photograph, backing sand drops from mill into Royer and is thrown onto conveyor leading to various molding stations. Fast Royer action keeps production humming.

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Scrap Offers Cure to Shortage of Metallics

UNLESS ferrous foundries are able to secure greater tonnages of metallics, needs for gray iron, malleable iron and steel castings probably cannot be realized during 1948. In many localities, plants are faced with critical shortages of pig iron, and some curtailment of operations has been reported. Foundry shutdowns resulting from severe winter weather and shortages of gas in some industrial centers has failed to provide much relief for the tight pig iron situation. As foundrymen endeavor to satisfy their metal requirements with iron and steel scrap, demand has so far exceeded the supply that prices have reached fantastic levels.

While total production of ferrous castings in 1947 approached record levels, indicating that tremendous tonnages of pig iron and scrap were melted in foundry furnaces and poured into molds, requirements of American industries for cast parts were not entirely fulfilled, due largely to the problem of metallics supply. Blast furnace operators and scrap dealers could not provide enough metal to go around, and now the situation is nearing the critical stage.

What can be done to improve the position of ferrous foundries? The key to the problem may be found in pig iron, scrap and allocations.

One authority is hopeful that the supply of pig iron will improve as the year goes along. However, production difficulties due partly to poorer grades of coke; changes in furnace ownerships resulting in variations in the pig iron distribution pattern; probable need for relining a number of furnaces, and other factors probably will prevent much of an increase in the foundry industry's share of pig iron.

Increasing the supply of iron and steel scrap offers the best cure for present scarcities. Authorities point out that the government is the best source of scrap at the moment. War Assets Administration probably has several million tons of scrap in its warehouses in the form of obsolete or useless tools and equipment which should be released at once. Other potent sources include the Army, Maritime Commission, auto wrecking yards, farms, and foreign scrap. While some scrap collection projects are under way, the tempo of all programs should be increased, and the collection of scrap pushed to the limit.

Allocation of pig iron should be carefully avoided. After the recent unhappy experience in the allocation of pig iron for housing, foundrymen have every reason to fear such unfair methods of distribution. The only way to provide more freight cars, agricultural implements, petroleum equipment and housing, and at the same time provide castings for the manufacture of thousands of other commodities essential to our civilization, is to increase the supply of metals for all branches of the vast iron and steel industry.

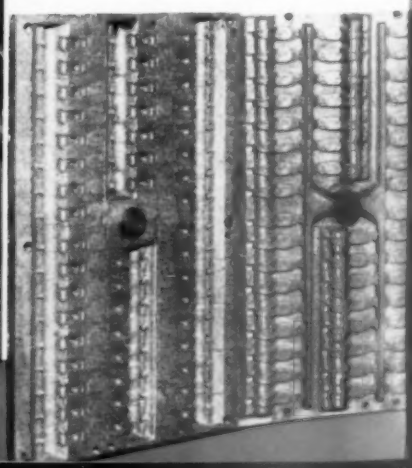
Frank G. Steinebach

Editor

Fig. 1—Pouring stacked molds at Wisconsin Appleton Co., Milwaukee. The flasks are stacked ten high

Fig. 2—This mold ready for stacking, has the pattern's cope impression in one face, the drag in the opposite face

Fig. 3—These cope and drag pattern plates indicate the type of castings made successfully by multiple molding



Multiple Molding Can Increase Production

By WILLIAM G. GUDE
Managing Editor
The FOUNDRY

ATTEMPTS to offset today's high charges for materials and labor make it desirable to investigate all foundry processes which offer possibilities of lowering unit cost of production. In the molding department numerous sources of cost saving will bear close scrutiny. These include not only the broad subject of materials handling, but also the molding practice and type of equipment employed, in order to determine what is best adapted to the product being cast.

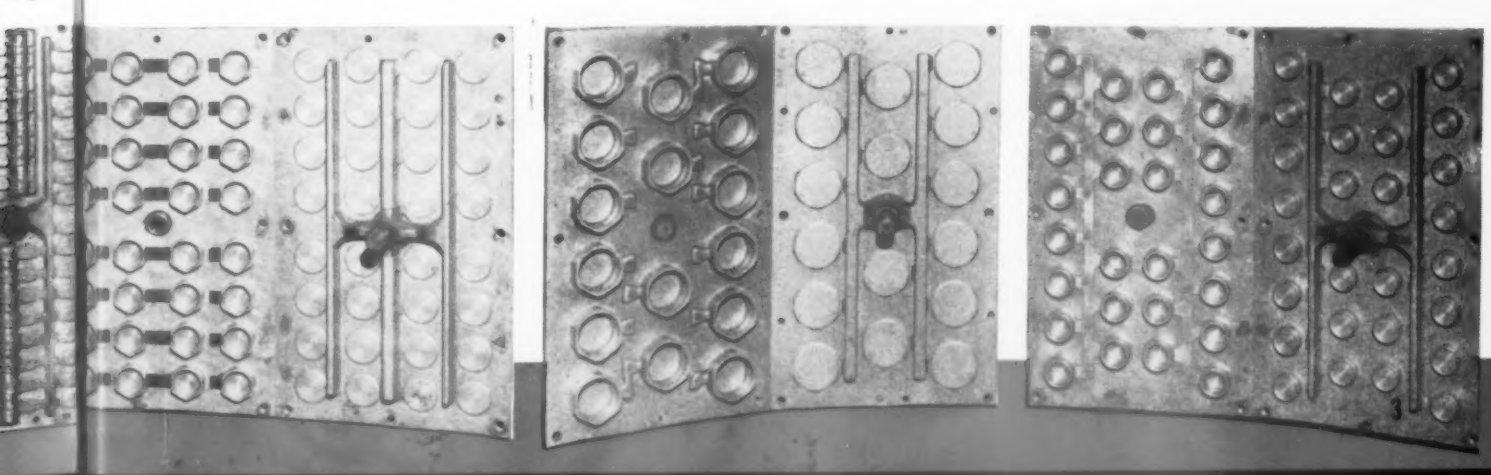
One molding practice which has demonstrated cost-saving potentialities when properly used is stack or multiple molding. Although similar in results, the terms "stack" and "multiple" denote somewhat different molding methods. In stack molding most patterns are flat back or the impression of the pattern is on only one side of the flask. Most of the flask alignment is intended for pouring purposes only and the lineup usually is accomplished by guides on corners of the flask. In multiple molding the pattern impressions are in both the cope and drag halves of the molds, and pins or bushings or some other accurate method must be employed to insure true alignment at the parting line.

Through a description of the multiple molding methods developed at the Wisconsin Appleton Co., South Milwaukee, Wis., through the work of William Hoernke, foundry superintendent, and E. B. Hansen, this discussion will outline in a general way what the process involves, as well as some of its advantages and limitations.

Although multiple molding is not employed extensively in the foundry industry, it is not, of course, a new process. In general, the practice is limited to the production of relatively small or shallow castings, and is particularly adapted to such castings in which long runs are involved. However, the method also has been applied successfully for some relatively large castings, employing single pattern mountings. One case in point at a certain foundry is a 22-in. diameter gear with a face of approximately 2 in. In this instance the important advantage of the method is the saving in floor space; the difference in floor area required for 300 molds laid out singly on the floor and that for 75 stacks of four castings each is obvious.

Before the method is attempted it should be understood that, to obtain maximum benefit, the use of carefully engineered patterns, flasks and molding machines is necessary. Moreover, selection of the correct molding sand also can present no minor problem.

Small castings comprise a large part of the Wisconsin Appleton Co.'s output. A producer of malleable iron castings, the company is a subsidiary of the Appleton Electric Co., Chicago, maker of various types of electrical equipment, including conduit fittings which require numerous small parts. Average weight of the thousands of different types and sizes of castings produced—all of which go to the parent organization—is about ¼-lb. Because of its large volume of repetitious work on small castings, the foundry decided to investigate the possibilities of stepping up certain of its molding operations through the multiple molding process. About two years was spent in



developing the practice to its present successful status.

Extent of the improvement achieved in production to date may be measured by the fact that the current molding rate for the type of castings indicated in the accompanying illustrations is approximately 500 molds per operator for a 7½-hour molding day. Under the former practice, which involved cope and drag molding, production averaged 180 molds daily.

In contrast to the cope and drag molding method, which requires two flasks for a complete mold, multiple molding combines cope and drag in one flask, with the cope cavity in one face and the drag cavity in the other. When the flasks are stacked, the drag side of each combines with the cope side of the adjoining flask to form a complete mold. This process is repeated through the entire stack. At Wisconsin Appleton the flasks are stacked ten high. This provides nine complete molds, since mold cavities in the upper face of the top flask and the lower face of the bottom flask are not mated with an adjoining cope and drag and serve no purpose when the mold is poured. A common sprue through the complete stack of molds feeds hot metal to runners leading to the individual casting cavities. The sprue hole in the bottom flask is closed by insertion of a stop-off core.

At present the company is producing ten different castings by the multiple molding method. Other castings are molded by more usual processes. Metal patterns for cope and drag of four of these stack molded castings are shown in Fig. 3, while Fig. 4 illustrates how the patterns are mounted on the jolt squeeze machine which produces the molds. In this latter view the machine head has been tilted back preparatory to placing the flask in position. It is obvious the patterns must be provided rigid anchorage on the machine plate and head to maintain an accurate match of the mold cavities when the flasks are stacked.

As another departure from conventional machine molding it might be pointed out that the lower pattern shown in Fig. 4 provides what eventually becomes the cope, and the drag is molded by the upper pattern. The latter actually is the equivalent of a drag molded in the usual manner and then rolled over—but without the necessity of the rollover operation.

Figs. 3 and 4 also show the sprue mounted permanently in the cope pattern. In normal position it extends about 1 in. above the top of the flask and is fitted in a sleeve which permits it to be depressed when the mold is squeezed. A hardened insert mounted on the upper pattern plate takes the impact with the sprue in this operation. A spring in the base raises the sprue after the squeeze is completed. This provides a uniform sprue hole completely through the mold and eliminates possibility of damage which could occur to the pattern if a fixed sprue were used. An electrical heater element is attached to the patterns to prevent sand from sticking, thereby assisting in drawing the patterns.

The pattern plates measure 11 x 19 in. and are mounted onto a set of master frames affixed to the table and platen of the molding machine. Flasks also are 11 x 19 in. and 2½ in. deep. Standardization of these dimensions facilitates pattern changes. The flasks are rigidly constructed, with a central reinforcing bead around the side helping to prevent distortion and misalignment of the stacked molds. After extended service, including the shock of mechanical shakeout, no difficulty from distortion has been encountered. Handles at both ends of the flasks are fitted with sockets on the bottom and pins on the top. The former fit over pins on the molding machine table during molding and, subsequently, over the pins of the flask on which *their* flask is stacked.

Fig. 5 shows the operator preparing to place a flask in position on the machine. On top of the positioned flask a strike-off frame 1 in. thick is placed. Bushings in both ends of this frame, which may be seen on the floor at the right of the operator in Fig. 6, fit over the flask pins to hold the frame in place.

After sand is shoveled into the flask and frame, two jolts of the machine (*Please turn to page* 198)

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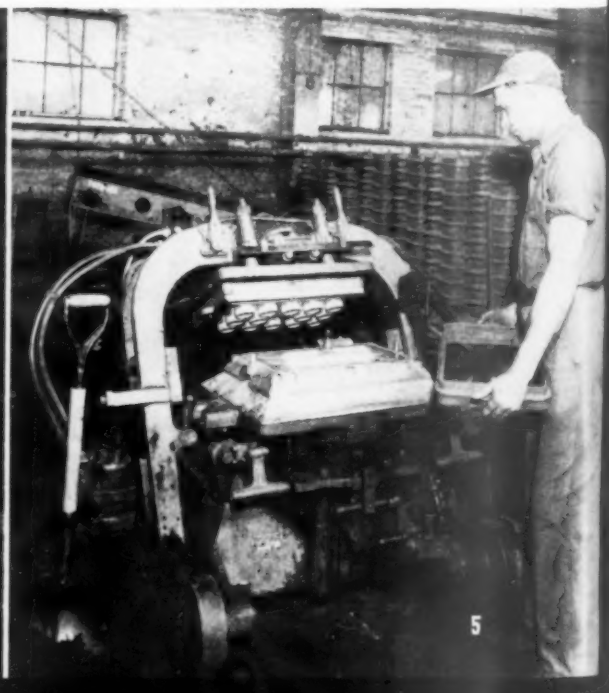

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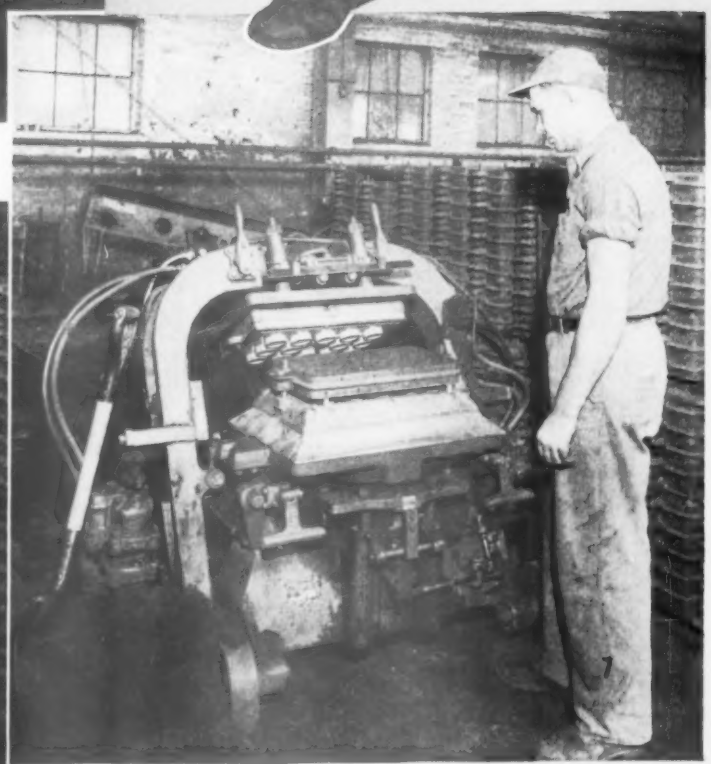
Fig. 4—Method of mounting patterns on the jolt squeeze machine used to produce the molds

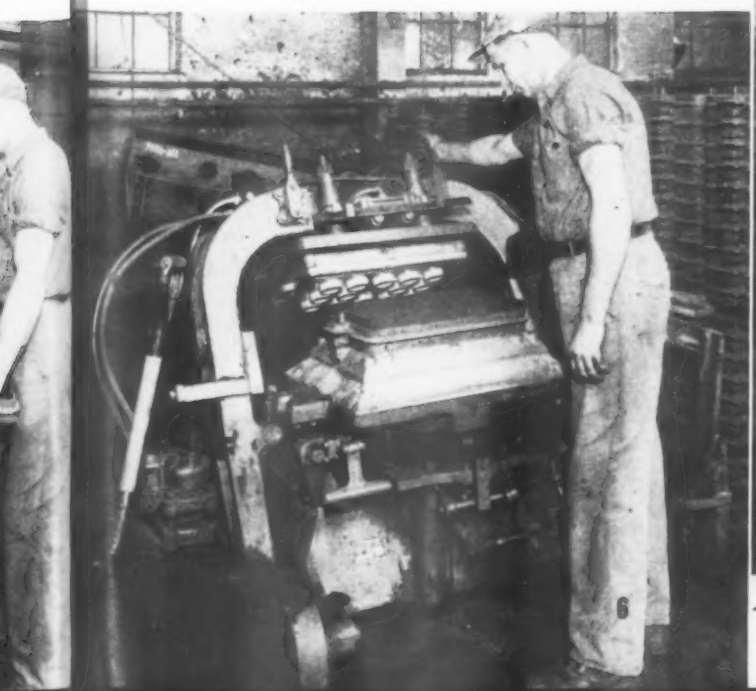
Fig. 5 — Operator preparing to place the 11 x 19 x 2½ in. flask on the machine

Fig. 6—This mold has been jolted preparatory to squeezing. A strike-off frame, just removed, leaves the sand projecting from top of the flask

Fig. 7 — Here the squeeze is completed, machine head tilted back and the flask stripped

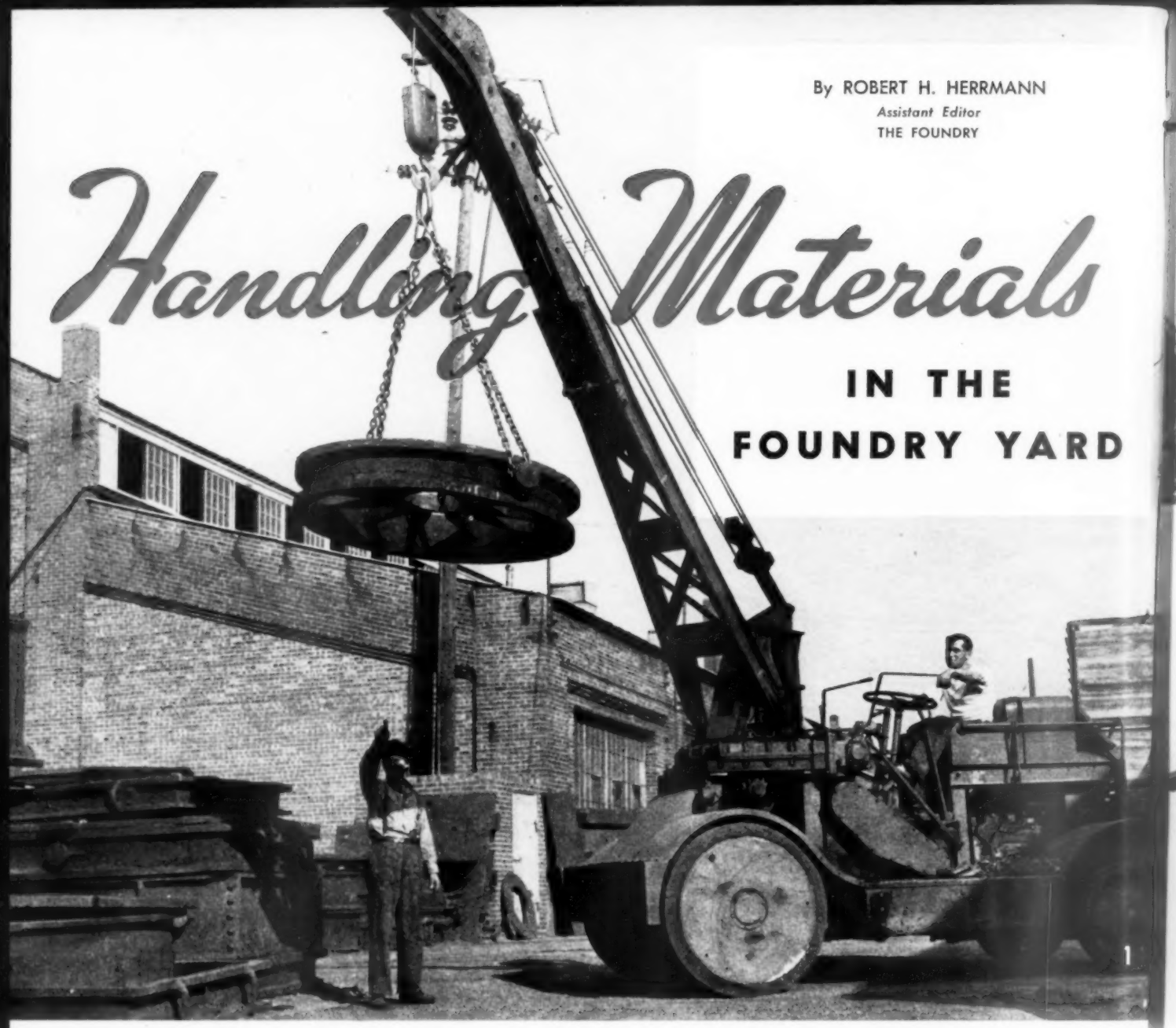
Fig. 8 — The finished mold. It provides 14 castings, or 126 for a ten-high stack





By ROBERT H. HERRMANN
Assistant Editor
THE FOUNDRY

Handling Materials IN THE FOUNDRY YARD



HANDLING raw materials brought into the foundry yard is one production cost which adds nothing to the value of the finished casting. Any saving which can be effected in that phase of foundry operation means extra profit for the foundry. As the competitive situation increases, such cost reductions can become especially important.

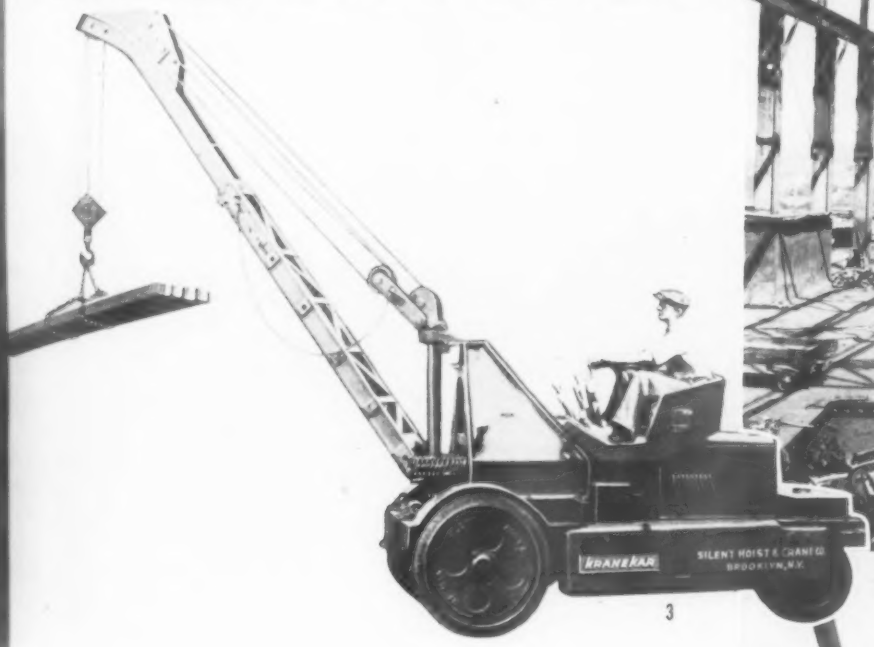
Substantial savings can be made through the use of mechanical equipment in unloading, rehandling and storing pig iron, scrap, coke, sand, limestone, briquets, foundry supplies and other materials used in the foundry. For example, a foundry in Cleveland saved $300 monthly on demurrage charges alone when it put into operation a portable yard crane for unloading carloads of supplies. Such an economy is the direct result of reducing the time required for a given operation.

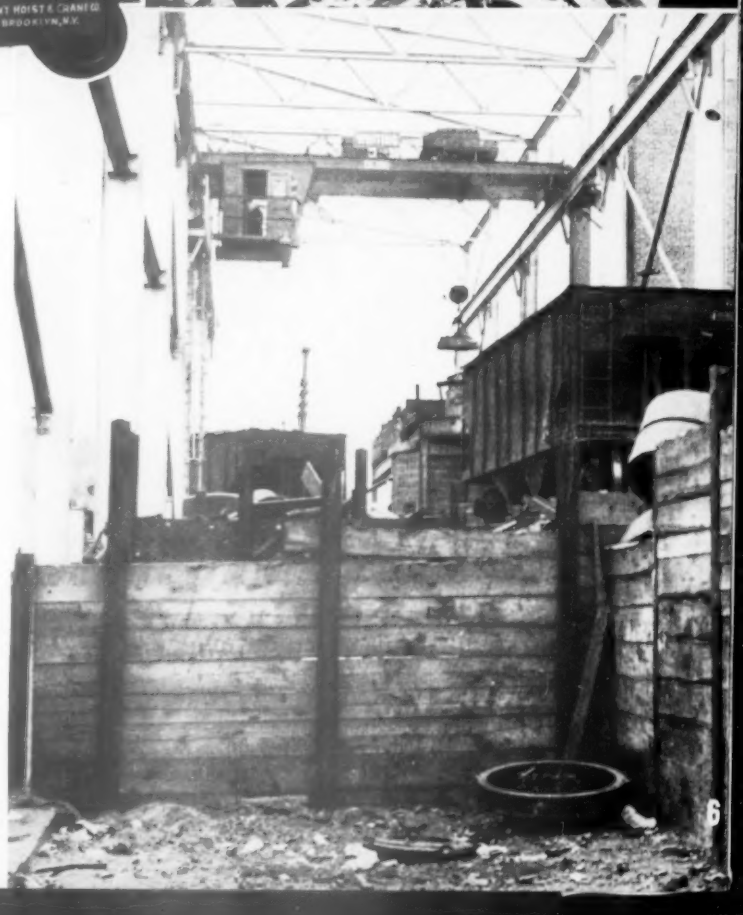
Other factors contributing to economies of mechanically handled material are: Reduction of direct labor charges through the use of machines that can do the work of several men expeditiously; elimination of the need for rehandling materials by moving them only once from car or truck to final place of use or storage; and reduction of the safety hazard through the use of fewer men to do heavy yard work.

Furthermore, when machines do the hard, heavy work, foundries become better places in which to work and are more likely to attract personnel.

Antiquated handling methods hamper production, with the consequent stunting of foundry growth so that economies of size and workman efficiency cannot be realized. These factors are reflected directly in higher production costs which, in turn, boost the final selling price of castings. Demand for expanded production has created the necessity for rapid handling of materials in volume.

Modern materials handling equipment has gradually replaced and is replacing antiquated, back-breaking materials movement methods. Foundries of all sizes can use materials handling equipment to a greater or lesser degree. The type and amount of equipment depends upon the volume and variety of





material which must be handled in any particular foundry operation, the layout of the plant site, and the method of delivery—by truck or railroad. In the foundry yard, where raw material shipments are received, different types of equipment may be put into operation. By using different attachments, cranes of the portable, gantry or overhead types can be used for handling sand, pig iron, scrap, limestone, flasks, castings, machinery, and for miscellaneous heavy lifting and moving jobs.

Fig. 1 shows a portable yard crane being used to stack flasks in a foundry yard. This crane has a capacity of 7½ tons and is powered by a four-cylinder tractor engine. The boom swings around either side (traverses 180°), is raised, lowered, held automatically and has simultaneous boom-swing and lifting or lowering of the load. All crane action is by tractor power. Width is 96 in., length (not including boom) 105 in. and turning radius, 20 ft, 6 in.

A crawler-mounted crane with electric lifting magnet attached is shown handling scrap in Fig. 2.

Clamshell and dragline buckets of ⅜ to 3 cu yd capacity may be attached to these cranes for handling loose materials. The cranes may be obtained mounted on wheels instead of on crawlers.

A portable crane with front wheel drive and rear wheel steering is shown in Fig. 3. Powered by gasoline or diesel engine and mounted on pneumatic or solid rubber tires, this crane is available with booms 9 to 37 ft long or telescopic booms adjustable in length. Rear-wheel steering permits a very short turning radius. The crane will pick up a load of 10 tons and transport it to the position desired; one engine powers the machine for travel and for all crane operations. Load line hoisting, boom topping and boom swinging with full load may be performed independently or simultaneously.

Fig. 4 shows a gantry crane which services a row of storage bins. These bins are for storage of pig iron, scrap, coke and limestone along the railroad siding on which cars bring the raw materials into the foundry yard and within reach of the crane for unloading. In addition to unloading materials the crane is used for charging the foundry's cupolas and for loading castings for shipment out of the foundry. The crane shown here is a combination gantry crane and cupola charging unit, both of 5 tons capacity.

Overhead cranes of 5-ton capacity are shown in Figs. 5 and 6. The crane in Fig. 5 is at work unloading pig iron from a railroad car and stacking it along the siding.

Most of the different types of cranes can use a hook, magnet or bucket in performing their work. One of the many types of buckets available is shown handling sand in Fig. 7. This is a low headroom single line bucket of great width and limited closing power, which is said to be an advantage because the bucket will not dig into the floor on which loose material is piled. The closing mechanism consists of two folding arms arranged symmetrically in relation to each other so that the crane hook can descend into the bucket on the vertical center line. As a result, this bucket will operate in very little

headroom thus making it suitable for use with almost any type of foundry crane, monorail, derrick or similar rig.

Lifting magnets, such as the one pictured in Fig. 8, are used chiefly in handling scrap and pig iron, but might find other foundry applications in handling castings and lifting and dropping a large iron ball for breaking up scrap. They are available in different sizes and shapes—one manufacturer furnishing round magnets in sizes from 12 to 65 in. in diameter and rectangular magnets in sizes from 25 to 85 in. long.

Industrial trucks are among the most versatile and mobile of materials handling equipment machines. They are suitable for handling all types of foundry raw materials, equipment and finished castings and are quickly converted from one type of job to another through the use of attachments. A 4000-lb capacity fork lift truck with 10 cu ft capacity scoop attachment is shown ready to pick up a load of scrap in Fig. 9. The same type of equipment can be used to handle such bulk materials as sand or limestone.

The lift truck shown in Fig. 11, lifting ingots, is equipped with a 48-in. bucket of 12 cu ft capacity. This type truck has unloaded a 50-ton box car filled with loose bulk or barrel packed scrap metal in 3 hr. The reduced time results in a saving of 21 man-hours per car. Barrels loaded with 600 lb scrap each can be handled two at a time by the truck.

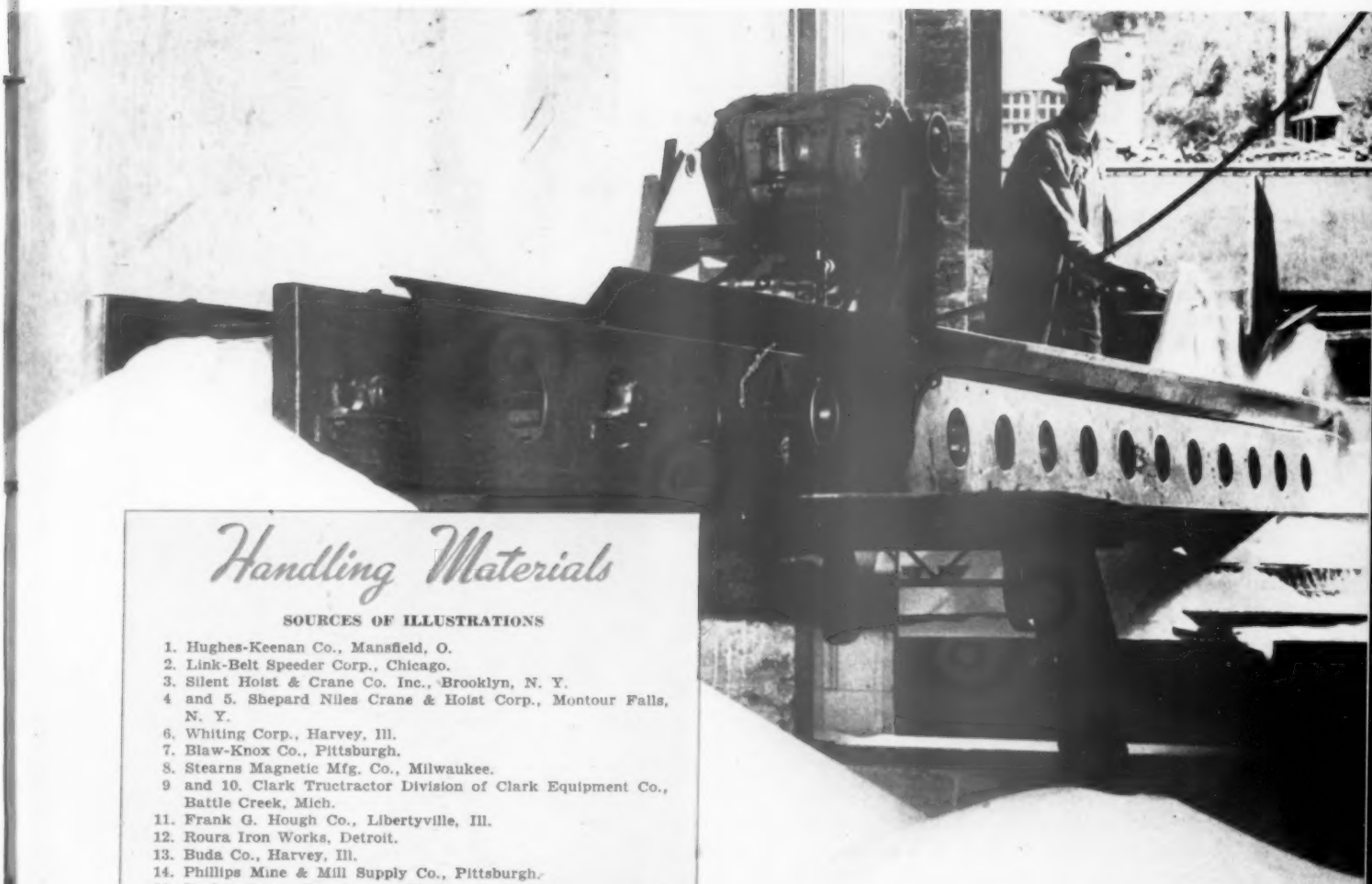
Heavy lifting and transporting jobs such as the stacking or moving of large castings, machinery or foundry equipment can be done by crane or ram attachments. The former is shown in Fig. 10. And, of course, trucks with standard forks find many applications in the lifting and transporting of large and heavy items either with or without pallets, and when used with tote-boxes, bulk materials may be hauled. Using standard forks attached to a revolving head mounted to the truck permits the lifting, transporting and dumping of tote-boxes without manual handling.

Self-dumping hoppers for handling all types of materials have been built to fit any lift truck. Of ½, ¾, 1, 1½ and 2 cu yd capacities, the hoppers may be picked up by fork or platform type lift trucks. At the point of delivery and at any height reached by the lift, the operator releases one catch and the hopper automatically tips forward gradually, completely empties itself, returns to the upright position and locks. These hoppers are shown at work in Fig. 12 (A and B).

Small dump trucks such as shown in Fig. 13 facilitate the handling of bulk materials. This truck comes in three models—one of 1000-lb capacity and two at 2000-lb capacity. The 1000-lb model and one of the 2000-lb models have loading space of 12.8 sq ft, and the larger 2000-lb model has loading space of 20.1 sq ft. All models are powered by a single cylinder, 4-cycle, 7.7-hp gasoline engine. The dump truck body is optional equipment and is detachable.

Dump trailer shown in Fig. 14 may be towed behind any tractor or truck and is available in various capacities. It may be equipped with steel or rubber tires.

Car unloader and stockpiler-loader combine as a team for unloading bulk materials from hopper cars as shown in Fig. 15. The unloader conveyor has a



Handling Materials

SOURCES OF ILLUSTRATIONS

1. Hughes-Keenan Co., Mansfield, O.
2. Link-Belt Speeder Corp., Chicago.
3. Silent Hoist & Crane Co. Inc., Brooklyn, N. Y.
4 and 5. Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
6. Whiting Corp., Harvey, Ill.
7. Blaw-Knox Co., Pittsburgh.
8. Stearns Magnetic Mfg. Co., Milwaukee.
9 and 10. Clark Tructractor Division of Clark Equipment Co., Battle Creek, Mich.
11. Frank G. Hough Co., Libertyville, Ill.
12. Roura Iron Works, Detroit.
13. Buda Co., Harvey, Ill.
14. Phillips Mine & Mill Supply Co., Pittsburgh.
15. Barber-Greene Co., Aurora, Ill.
16. Material Movement Industries, Chicago.
17 and 18. National Engineering Co., Chicago.
19 and 20. Link-Belt Co., Chicago.

capacity of up to 3 tons per minute operating in pits or above rails. The stockpiler-loader has a belt width of 24 in. and comes in lengths of 25, 30 and 35 ft. It may be powered by gasoline engine or electric motor. Both units are portable and well balanced for easy handling.

Another type portable power conveyor, for handling bulk materials up to 14 in. top size, is shown in Fig. 16. In this instance the conveyor is being used to unload foundry sand from a box car into a shed. Two men are kept busy shoveling sand into the conveyor which is said to cut 14 hours time from unassisted hand shoveling methods during the unloading of a 75-ton car of sand.

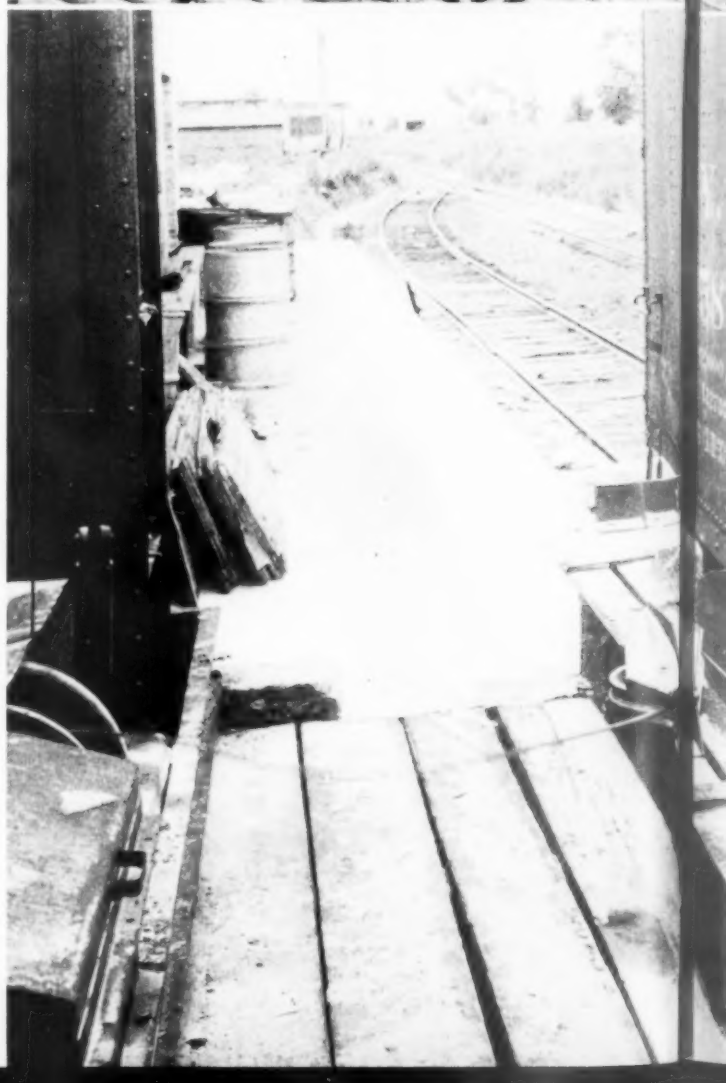
Some foundries have used this type conveyor for unloading cars of pig iron. The conveyor is mounted on wheels for easy moving from job to job, while other models come mounted on a combination trailer and hydraulic lifting device to facilitate movement and for quick adjustment of conveyor angle. These models come in 14 and 20-ft lengths with discharge heights of 10 and 14 ft, respectively, and with the incline angle adjustable to 45 degrees. Power is furnished by an electric motor or gasoline engine.

Another sand-handling installation which requires a minimum amount of manual handling of the sand is shown in Figs. 17 and 18. Fig. 17 shows the new sand being dumped from a railway car into a track hopper. A feeder under the track hopper delivers the sand to an inclined belt conveyor, as shown in Fig. 18, which in turn discharges the sand into a rotary drier. Sand leaving the drier is cooled and deposited in the large storage bin which can be seen in the upper left of Fig. 18. That bin is divided into a number of compartments each holding a different grade of sand. Traveling weigh lorries are employed for depositing the correct amount of each grade of sand into the mixer where it is mulled with the proper bonding material. The prepared core sand is delivered to the coremaking stations by a monorail.

In other installations the sand may be taken directly from the railway cars to storage and then taken as needed through the drier on its way to the sand preparing plant, or it may be taken directly from storage to the mixer.

Another core sand handling installation is shown in Fig. 19. The sand is unloaded from hopper bottom railroad cars to a storage silo through the medium of a dump hopper, a short belt conveyor feeder, and a vertical steel-encased bucket elevator for delivering the sand into the top of the silo. The silo discharges sand into an electric dump truck.

Fig. 20 shows soda ash being unloaded by automatic power shovel from a box car into a chute which could lead directly to a storage bin or to a conveyor carrying the material to storage. Similar installations have been used for unloading dried sand from box cars.



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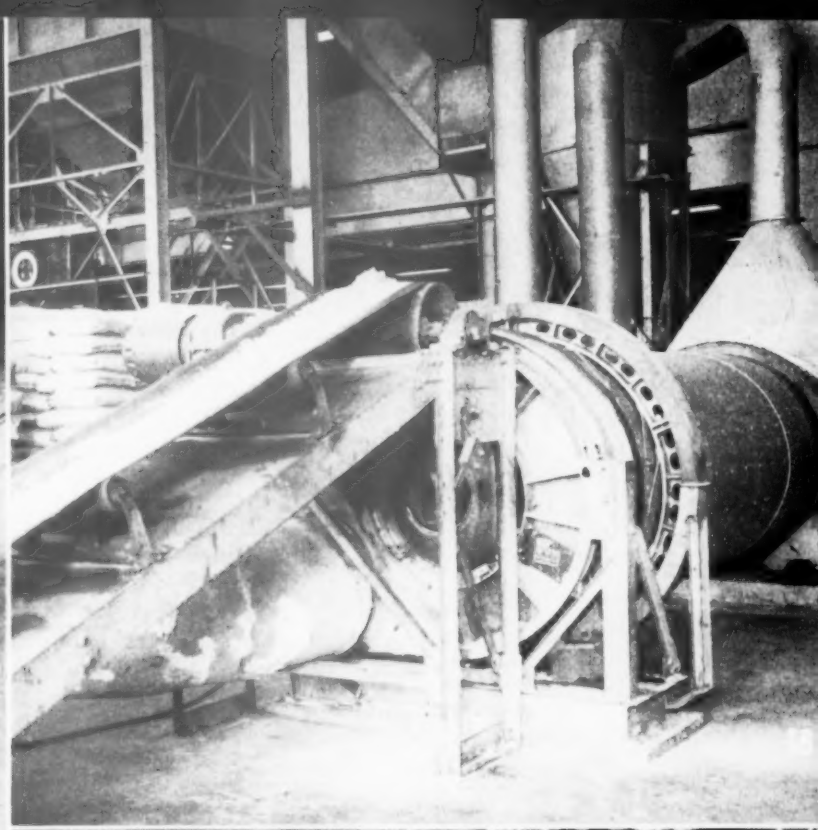

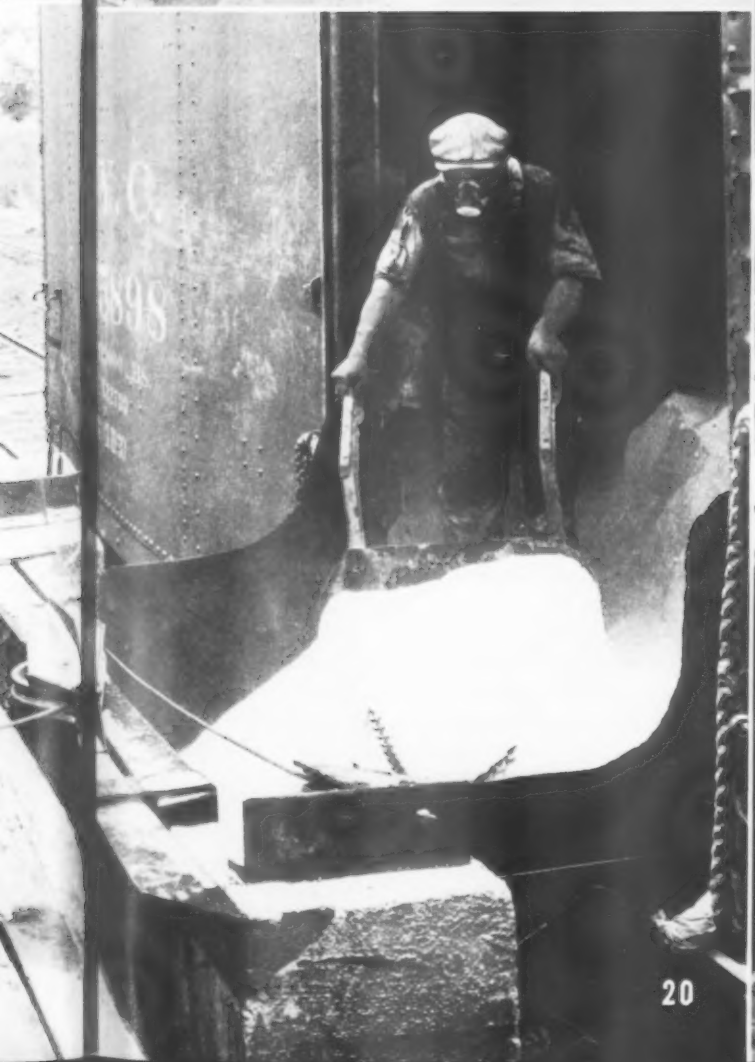

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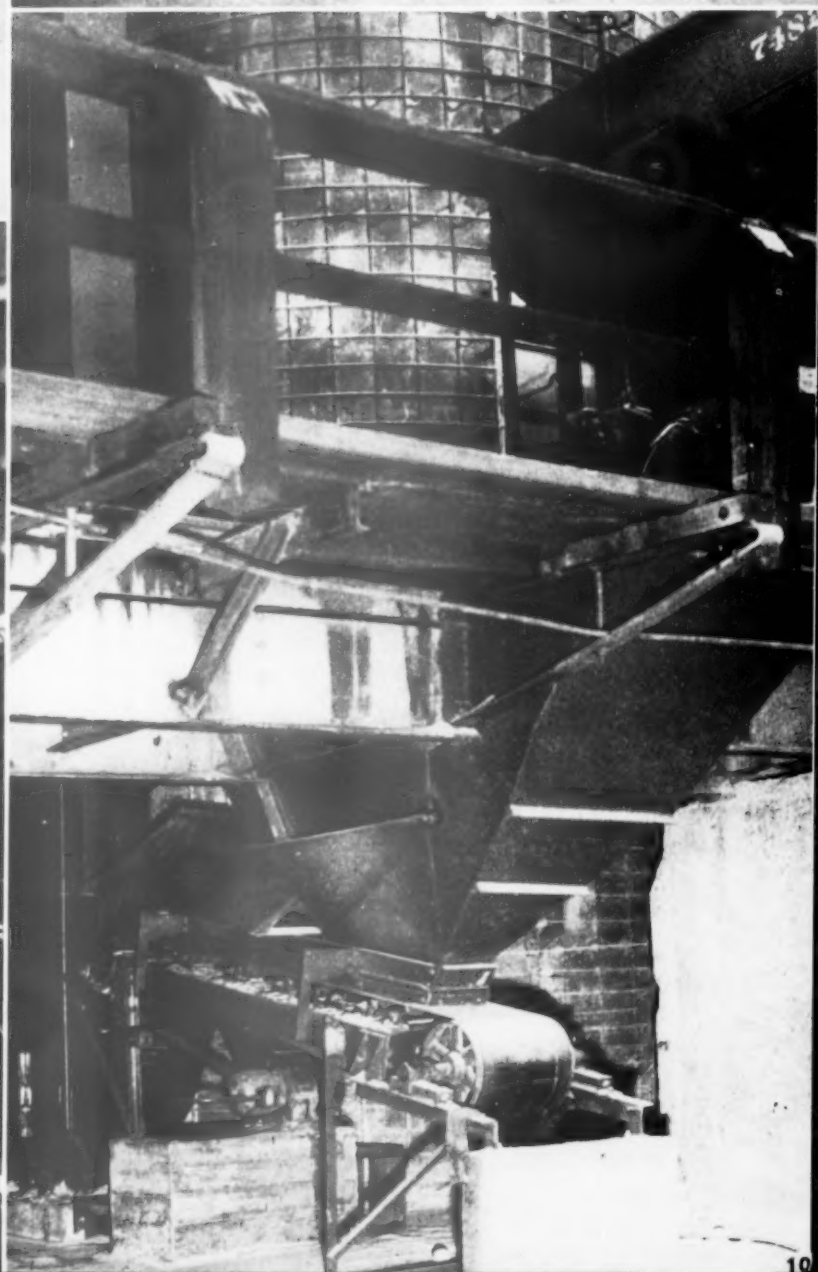

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CURRENT MELTING PROBLEMS in the Gray Iron Foundry

By DONALD J. REESE
International Nickel Co. Inc.
New York

JUST as growing youngsters seem to have the habit of learning "the hard way" through injury, frustration or failure in attaining their education, just so are we now learning "the hard way" about raw materials. It is a painful experience to have the habit of using 36 per cent pig iron (average for industry in 1946) in the cupola metal charge and suddenly learn your supplier can furnish no more. It is frustrating to contact one supplier after another only to learn they cannot add to their families of consumers. There is no failure more unexplainable—in a country such as ours has been and in an industry such as ours with capacity beyond our 1947 performance—than to have a high demand for our product and not satisfy it.

Although no one has yet devised a method whereby we can produce a ton of castings without using a ton or more of metallics, *there has been, and there still is,* considerable latitude in the choice of ingredients that may be used to assemble a ton of metallics. That is, the choice of ingredients for a cupola metal charge might range from one extreme of practically all pig iron to the other extreme of practically all steel scrap. Between these two extremes are wide ranges of choice in pig iron, foundry returns, steel scrap, purchased scrap, lump ferrosilicon, lump ferromanganese, ferroalloy briquets, spiegeleisen, etc.

For example, the production of chilled car wheels is an illustration of an iron foundry product in which the cupola metal charge is made up almost entirely from purchased scrap.

Some foundries in this country are so located that, in normal times, pig iron was not used because transportation expense made it prohibitive. Other foundries are in areas where there is little or no generation of cast iron scrap; and still other foundries are in areas where the chemistry of the available pig iron or cast iron scrap is not suited to the chemistry desired for their product. Over the years these foundries have made gray iron castings with steel scrap their principal source of metallics. Thus, for one reason or another, a number of foundries have accepted as normal, the conditions that many of us are now worrying about.

Two years ago I spent several days analyzing melting department performance in the gray iron foundry of a railroad company. In a letter written to them after my visit appears this sentence: "Frequently the top grades of cast iron are made from a 100 per cent scrap mixture and it is not uncommon for a gray iron foundry to operate without pig iron." At the time of my visit, a cupola charge contained

25 per cent Chateaugay pig iron, 40 per cent railroad spring steel scrap, and 35 per cent foundry returns and purchased cast iron scrap. As this railroad generated steel scrap, I suggested it would be to their advantage to use some of it in their gray iron foundry rather than to sell it. They switched to a charge containing no pig iron, 60 per cent scrap, 37¾ per cent foundry returns and purchased cast iron scrap, 1⅝ per cent lump 50 per cent ferrosilicon and ⅝ per cent lump 80 per cent ferromanganese. I checked this foundry on subsequent visits over the next year or so, and on my last visit they were continuing to use these ingredients in their cupola charge without difficulty.

Assuming that an average cupola metal charge contains about one-third pig iron, one-third foundry returns and one-third purchased scrap, we could say that the hazards of producing an iron of desired chemistry were small because we know the chemistry of the pig iron—in fact, we bought the pig iron to an analysis most suited to our foundry—but also because pig iron satisfied one-third of our needs for metallics. In order to use metallics intelligently we must know enough about their chemistry to keep the risk of producing off-chemistry cast irons within practical limits and, of course, to avoid using those metallics whose chemistry includes an element not desired in the iron. For example, a malleable foundry or a gray iron foundry producing very light sections should not use steel scrap containing appreciable quantities of chromium.

However, our major concern in producing cast iron, so far as chemistry is concerned, is whether it contains more or less than 3.5 per cent total carbon, with less than 0.8 per cent of this carbon in the combined form and with flake graphite of the desired size and distribution, and if silicon is more or less than 2.0 per cent. In other words, if we start out to make an iron of 3.3 per cent total carbon and 2.2 per cent silicon, can we achieve this chemistry?

How would it be possible, say, to use practically 100 per cent steel scrap containing only 0.2 per cent carbon and 0.1 per cent silicon, and produce an iron containing 3.3 per cent carbon and 2.2 per cent silicon? We would have to get carbon and silicon somewhere.

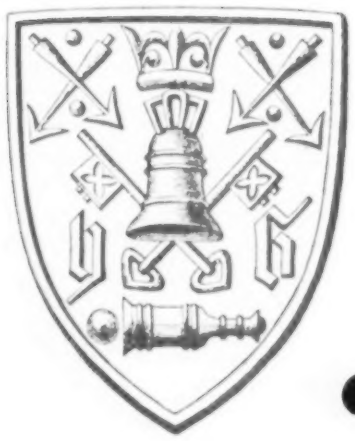
Cupola Is a Carburizing Furnace

The cupola is a carburizing melting furnace and tries to saturate metal with carbon—irrespective of whether the metal charge is 100 per cent car wheel scrap containing 3.5 per cent carbon, or 100 per cent steel scrap of 0.2 per cent carbon—to a carbon level of 3.6 to 3.8 per cent. Actually, silicon and phosphorus retard this carburizing characteristic of the cupola and I do not mean that you could produce a silvery cast iron of 10 to 15 per cent silicon or a very high phosphorus iron, say 1 to 1½ per cent phosphorus, and saturate these irons with 3.6 to 3.8 per cent carbon; but for the cast irons containing from ½ to 2½ per cent silicon and up to 0.2 or 0.3 per cent phosphorus, yes.

Whether any cupola will carburize a 0.2 per cent carbon steel charge to a cast iron carbon content of 3.6 to 3.8 per cent depends somewhat on the type and amount of coke used, whether fuel and metal charges are proper for the size cupola being operated, and if the cupola operating method produces metal temperatures high enough to absorb the maximum amount of carbon.

Most of us refer to the melting zone as the most important zone in the cupola. In my opinion, a zone immediately below the melting zone, a "superheating zone," is more important. Four basic conditions may exist in this zone; the temperature in this zone may be relatively hot—say 3100° F, or relatively cold—say 2950° F; the zone may be shallow in depth or it may be deep.

The slower one operates a cupola, the shallower is the depth of this zone; and the faster, the deeper it becomes. Melting speeds of cupolas range from a slow of ⅜ ton of iron per hour per square foot of cupola area to a high of 1⅛ tons. Thermal conditions in this zone are determined by the amount of coke used for intermediate coke charges. The range of intermediate coke charges varies from 5 lb of coke per square foot of cupola area to more than 35 lb. The more coke used per square foot of cupola area the colder the tem- (*Please turn to page* 184)



Church Once Cast On

THE idea of taking all the necessary tackle to a church to cast one or more bells would be ridiculed today, yet this was a regular procedure in the not-so-distant past. Modern bells always are cast in foundries which specialize in this class of work. In the past the itinerant bellfounders played a prominent part in the equipping of cathedrals, abbeys and churches with new bells, or in recasting those which had become unusable.

Probably the principal reason in earlier times for casting bells "on site" was the lack of transport facilities. This especially would be so on the large bells. Difficulties of transport would be aggravated by the condition of such roads as then existed. In the eastern counties of England the waterways frequently were used instead of the roads. It was easier to convey the necessary materials and facilities to the site, build the furnace, make the mold and cast the bell as near as possible to its intended home.

About the middle of the 14th century, four new bells were cast for Ely Cathedral. An ancient document throws some light on bellfounding in those days. The following translated extracts are interesting, in showing how the material was gathered together:

"For clay bought at Lynn—2 shillings 2 pence. For the expenses of Master John of Gloucester (the bellfounder. Ed.) going to Lynn—5 shillings. For clay bought to Ely at the same time—9 shillings 10 pence. For rods (probably stay rods for small reverberatory or air furnace. Ed.) bought once for making the furnace—15 pence."

Then follow sundry expenses incurred in sending around persons to different places to collect metal.

An interesting item is "For beer bought on the day in which the metal of the great bell is melted, beside what was had from the store . . . 4s 6d."

The next item relates to the bells: "For moulds for making four bells, and the casting of four bells from the aforesaid ore, of the following weight, that is to say: The bell called Jesus—37 cwt. 52 lb. The bell called John—27 cwt. 4 lb. The bell called Mary—21 cwt. 4 lb., The bell called Walsyngham—18 cwt. 4 lb."

Cost of this work was £18-18-0. The total cost of the metal itself appears to have been £31-11-3, but in all probability the purchased metal was augmented considerably by metal from the Sacrist's store. Upon the occasion of a bell-casting, it was quite customary for people in the neighborhood to bring various articles of copper, brass and other metals to throw into the furnace at the appropriate moment. Metal may have been collected in advance by the church authorities interested in the project. Local legend often attributes the particularly rich and resonant tone of an old bell to the large quantity of gold and/or silver vessels and ornaments contributed by the nobility. One can imagine that when the recasting of a bell (reputed to contain much precious metal) became necessary, the parishoners shrewdly would insist on the work being carried out under their vigilant supervision.

Melted Metal In Temporary Furnace

Often the churchyard was used as a site for a temporary furnace. Remains of furnaces and masses of bellmetal have been unearthed at several places in England, for example, Scalford (Leics.) and Empingham (Rutland). At St. Breward (Cornwall) a *ring* of four bells was recast and made into one of five in a garden just beyond the churchyard wall.

In 1629 the great bell of Wimborne Minster (Dorset) needed recasting and here again a very full account is retained. Under the heading "The Charges for Newe Castinge the Great Bell" one reads (among other interesting items) the following:

"Item for mettle for the great Bell—£17 8s 6d. Item for Bricks to make the furnace—16s 4d. Item to Henry Allen and his Sone for their garden to melt the great Bell in—15s. Item for wood in all to melt the great Bell—£1 19s."

There are one or two instances of bells actually having been cast in the church itself. The great Bell of St. Alban's, called "Amphibalus," was recast in the hall of the Sacristy in the early part of the 16th century. At Kirkby Malzeard (Yorks) the following entry, clearly indicating a casting "on site," occurs in the parish reporter:

"1591 . . . For paveing the Church where the Bell was casten—11s."

A notable instance of the (*Please turn to page* 236)

Bells

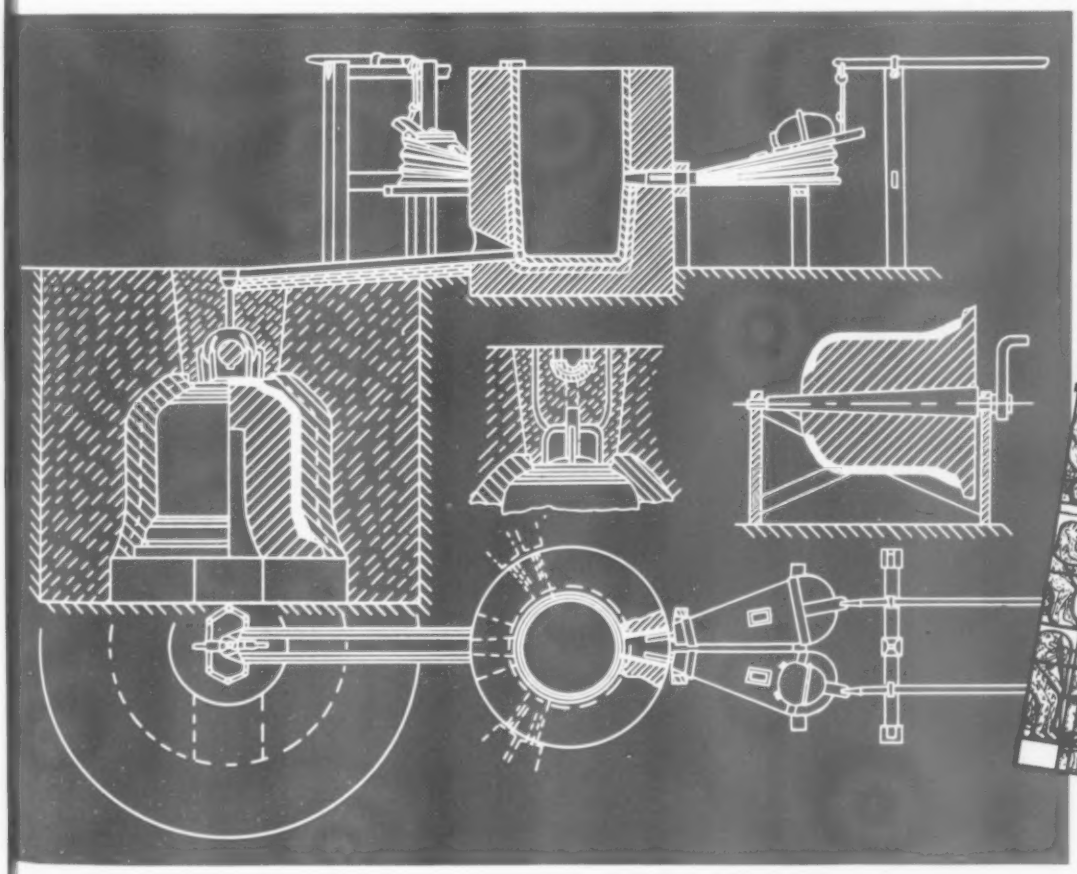
THE SITE

By F. R. NICHOLS
Stamford, Lincs., England

Fig. 1 (far left)—Mark of 15th century bellfounders of Bury St. Edmunds. Such founders also frequently cast cannon

Figs. 2, 3, 4 (right)—Sections of "The Bellfounders' Window" in York Minster, showing foundry processes in medieval days

Fig. 5 (below)—This sketch, taken from an old book, illustrates a bell mold and furnace and in several respects is comparable to the equipment depicted in the York Minster window



By PAT DWYER
Engineering Editor
THE FOUNDRY

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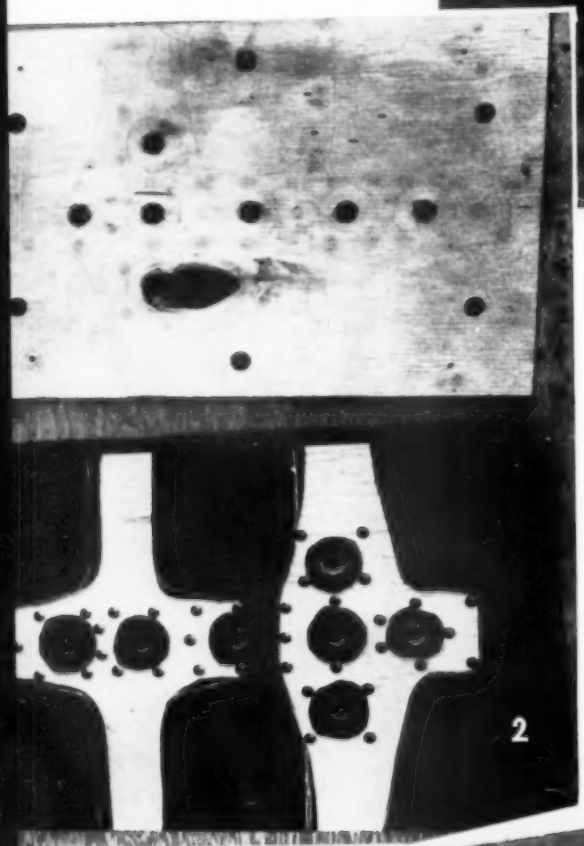
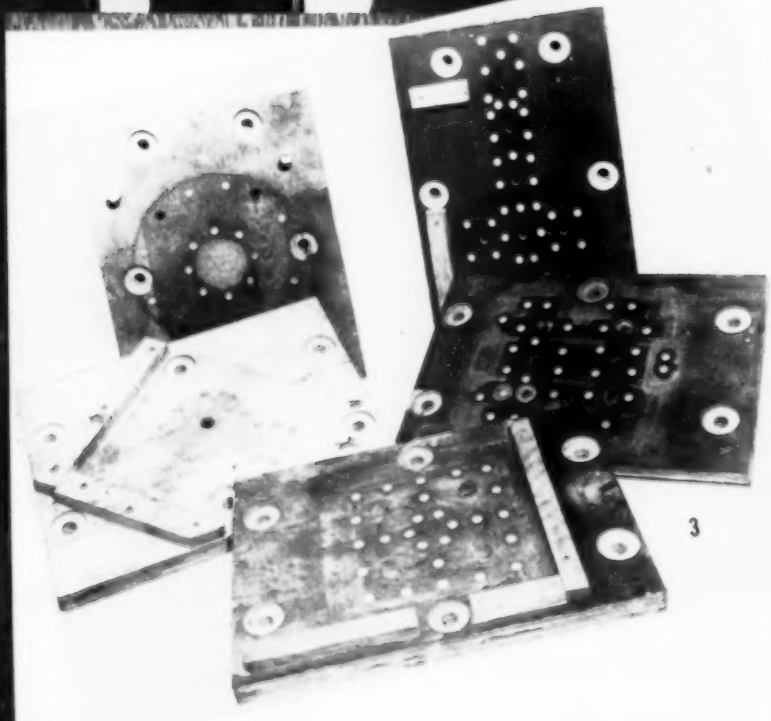


2

STEEL FOUNDRY USES

Wood Plate on C



3

MANY ingenious auxiliary features have been developed and incorporated in the core blowing machine since the first attempt in the United States to blow sand into coreboxes was initiated by a midwest manufacturer in 1911. At first the progress was slow but this method of making cores has found wide acceptance in recent years, with several manufacturers supplying machines in a wide variety of sizes and capacities. The latest auxiliary feature, as adopted and practiced at the plant of the Crucible Steel Castings Co., Cleveland, is the substitution of a plywood blow plate for the metal plate.

So far as available records indicate, this radical departure first was given publicity in a paper "Core Blowing Practice," by Lawrence D. Pridmore and presented in THE FOUNDRY, March, 1946. The following extract is from the author's reference to plates and coreboxes: "Substantially made hard-wood coreboxes may be used on a core blowing machine. The box further is reinforced with rods and with plates on the sides. Vents are needed in back drafted pockets, with all the vents coming out through the sides of the plate. The plate may be 1-in. plywood, used in connection with the master blow plate on the machine. This plywood plate comes up and closes all the holes in the other plate, except those needed for any particular job. With this arrangement a number of jobs may be mounted by matching the blow holes. A machine of this kind is capable of blowing cores in weight up to 200 lb. The blow hole in the plywood is reinforced with a cast iron or cast steel bushing."

In addition to the article by Mr. Pridmore, descriptive articles on all phases of core blowing have appeared in THE FOUNDRY: "Fundamentals of Core Blowing," by Russell F. Lincoln, February and March, 1940; "Core Blowing, Coreboxers and Driers," by Z. J. Madacey, June and July, 1943; "Constructing Boxes for Blowing Cores" by R. F. Lincoln and E. J. Swink, October, 1943.

Foundrymen Are Familiar With Terminology

As with several foundry terms, the term "blow plate" is not absolutely accurate when applied to a plywood board. "Blow plate" was applied in the early days when the plate was cast or rolled metal. The term carried over in the same manner that the support under a mold, whether wood or metal, invariably is referred to as a bottom board. However, foundrymen never experience any difficulty in interpreting any of these apparently contradictory terms. Since presumably they are the only interested persons in the present instance, no apology needs to be offered in continued reference to the plywood item as a blow plate.

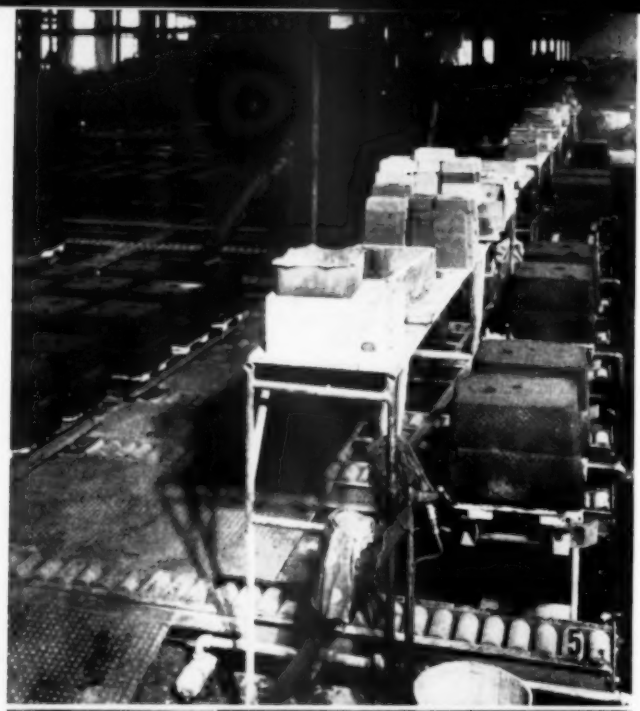
The Crucible Steel Castings Co. plant at West 84th St. and Almira Ave., Cleveland, with floor area 90,000 sq ft and handling approximately 200 patterns per day, is essentially a jobbing foundry. Castings range in weight from less than 1 lb up to 5000 lb. Many castings are made in large numbers, but the majority are in a miscellaneous classification with the orders covering single units, or comparatively small numbers. Obviously also, the operation of a core blowing machine involves the use of many coreboxes and the frequent change of blow plates.

Most of the small and large cores needed every day are made in the usual manner on the floor or bench, but a sufficient number lend themselves so naturally to the core blowing method, that the machine can be kept in constant operation. Machine production so exceeded production of similar cores on the floor or bench, that—at the time this was written—the company was preparing to install a second and larger machine. Displacement of several coremakers as a result of rapid machine production has not created

Core Blower

Fig. 1—Small castings are made in aluminum snap flasks on a battery of squeezer machines. Fig. 2—Top and bottom side of wood core blowing plate.

Fig. 3—Typical wood plates showing various designs in blow hole distribution. Fig. 4—Wood blow plate readily is attached by two bolts to the head of the core blowing machine



any problem. Then men readily are absorbed in the various molding crews. In nearly all instances the men have had experience in this branch of the molder's trade.

Bruce Aiken, superintendent of the foundry, frankly and modestly admits that the idea of using wood coreboxes and wood blow plates on a core blowing machine did not come to him in a blinding flash of inspiration, or through a long series of exhausting studies in an atmosphere illuminated and scented with the midnight oil. He saw the method practiced in a St. Louis steel foundry and decided to adopt it. Results up to the present amply have vindicated his judgment. As with all ingenious adapters and improvers, he has incorporated several variations to the original design.

In general core blowing practice, so far as published information is available, no definite formula or standard has been established to cover the relationship between the size and number of blowholes, and the size and number of vent openings. The same applies to the proper position of these various openings. Correct sizes and proper locations must be determined by considering the size of the cores, the contour of the corebox cavity and the characteristics of the sand. The former is determined by experience and the latter depends on the fineness of the sand. In most cases, with a high permeability sand a vent with 0.015-in. openings is recommended. Vents with 0.010-in. openings may be used with sand of lower permeability.

Considerable differences of opinion prevail on the number and sizes of the blow holes. The required number and size depend to some extent on the available air pressure. Low air pressure requires greater vent and blow hole area. Where a bulky core is made on a flat plate and (*Please turn to page* 224)

Fig. 5—A simple pneumatic device lowers the snap molds onto a long roller conveyor. Fig. 6—Medium size molds fall over ends of conveyor lines into steel pans in a long concrete wall pit. Fig. 7—Castings and sand are separated on a shakeout unit near the center of the foundry floor

Convention Preparations *Near Completion*

(Photo courtesy Convention and Visitors Bureau)

Philadelphia City Hall

PREPARATIONS for the 1948 Foundry Congress and Show of the American Foundrymen's Association in Philadelphia, May 3-7, are nearing completion. By early February, approximately 85 per cent of exhibit space in Philadelphia Convention Hall had been contracted for by producers of equipment, supplies and services, according to William W. Maloney, secretary-treasurer. As anticipated, the growing interest of manufacturers in the foundry market is reflected in the number of firms not recently represented in AFA shows that will exhibit in Philadelphia. Of those who had already reserved space, some 20 per cent were not in the record-breaking "Golden Jubilee" show of 1946 in Cleveland.

Details on show plans and regulations may be obtained from Alfred A. Hilbron, convention and exhibits manager, American Foundrymen's Association, 222 West Adams St., Chicago 6.

Assignment of hotel rooms has begun. As in recent years, accommodations are assigned by an official housing bureau. Applications for hotel space were mailed out to the membership and to exhibitors in January. Requests should be addressed to the AFA Housing Bureau, in care of the Philadelphia Convention and Visitors Bureau, 17th and Sansom Sts., Philadelphia 3.

With the technical program rounding into final shape, the first technical papers were released for preprinting in January. Mailing of preprints of the convention papers is scheduled for April 1, in order to give association members sufficient time to prepare written discussions for presentation at convention sessions.

AFA's divisions and general interest committees will supplement the exhibit with technical and general interest, round-table and shop course sessions, featuring up-to-the-minute data on developments in castings production and control techniques.

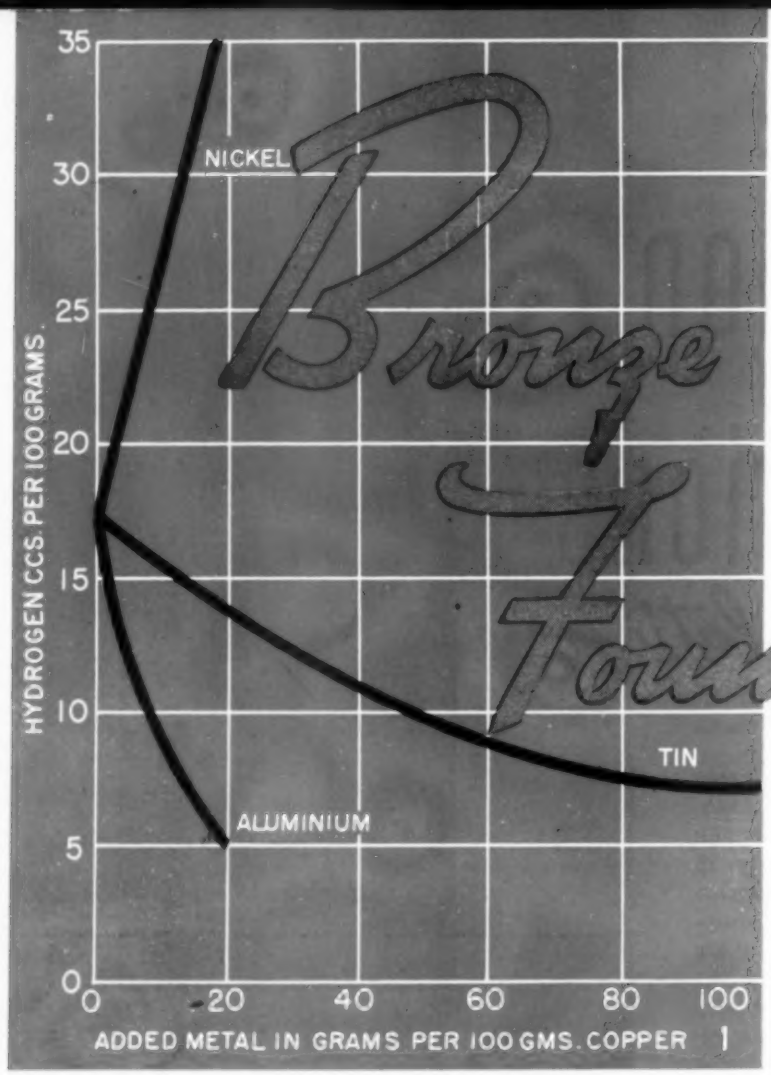
Technical papers on the Aluminum and Magnesium Division program include "A Fluidity Test for Aluminum Casting Alloys," by W. E. Sicha, Aluminum Co. of America, Cleveland, and "Al-Zn-Mg-Cu Casting Alloys," by L. W. Eastwood and L. W. Kempf, Battelle Memorial Institute, Columbus, O. The division's sessions are scheduled for Monday and Tuesday, May 3-4.

Malleable Division, which also will hold its meetings Monday and Tuesday, will present "Construction and Operation of an Oil-Fired Malleable Holding Furnace," by Fitz Coghlin, Jr., Albion (Mich.) Malleable Iron Co.; "The Effect of Mn-S Ratio on the Rate of Anneal of Black Heart Malleable Iron," by J. E. Rehder, Bureau of Mines, Ottawa, Canada.

Also, "Application of Correlation in the Malleable Foundry," by R. G. Seidel, National Malleable & Steel Castings Co., Cleveland, and "Production Hardness Testing in a Malleable Shop," by C. Schneider and L. Ulsenheimer of the same firm.

Among Steel Division papers are "A Theoretical Approach to the Problem of Dimensioning of Risers," by J. B. Caine, Sawbrook Steel Castings Co., Lockland, Ohio; "The Delayed Quench for Steel Castings," by S. L. Gertsman, Bureau of Mines, Ottawa; "Statistical Quality Control—A New Tool for the Foundryman," by G. A. Fisher and H. H. Johnson, National Malleable & Steel Castings Co.; "Tensile Properties vs. Composition of Normalized Cast Steel," by H. A. Schwartz and W. K. Bock, National Malleable & Steel Castings Co.

J. B. Caine will also present the report of the Mold Surface Committe, AFA Sand Division, "Changes in Chemistry of Liquid Steel (*Please turn to page* 166)



Bronze Founding

This paper, presented before a meeting of Belgian foundrymen at Brussels and published in a recent issue of Metallurgia, gives particular attention to latest developments in bronze foundry alloying, melting, pouring, feeding and molding practices

A REVIEW OF SOME RECENT DEVELOPMENTS

MUCH work has been carried out the past few years to effect improvements in the production of bronze castings, but it is not possible to deal with this subject as comprehensively as one might wish. Instead attention is directed more particularly to some of the main developments, which have taken place in Great Britain and America, concerned with the production of quality castings for engineering purposes. Broadly speaking, these can be divided into two main groups: Developments connected with alloying and melting methods and those connected with pouring, feeding and molding methods.

Alloying and Melting Methods

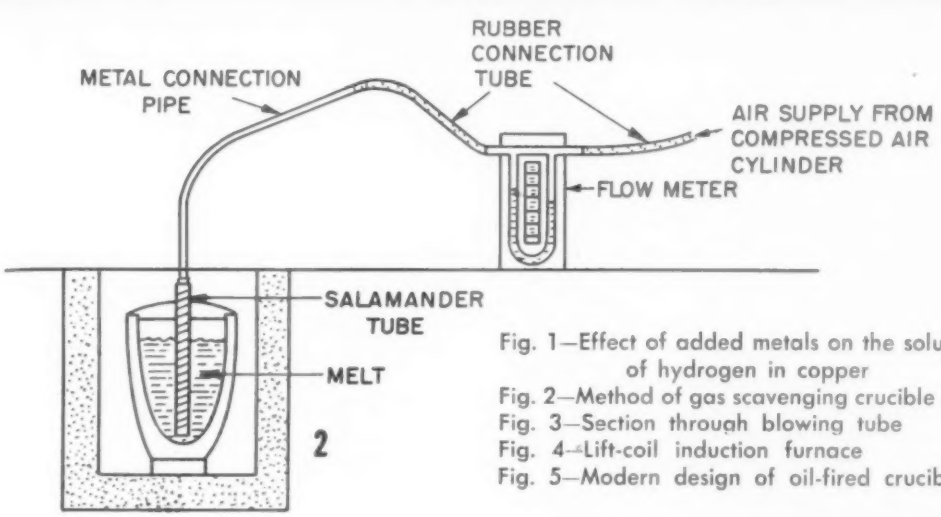
Effects of Dissolved Gas on Casting Quality—As a result of the excellent work done by the British Nonferrous Metals Research Association,[1] sufficient information is now available to enable the practical foundryman to understand and control the effects of dissolved gas in copper-base alloys.

Hydrogen is readily soluble in the majority of nonferrous metals and is, therefore, the most usual cause of gas-porosity. It should be emphasized that the rate of solution of nascent hydrogen—i.e., that derived from reaction between the metal and water vapor in the atmosphere or sand mold—is much more rapid than that of dry molecular hydrogen.

Until quite recently it was thought that all castings should be free from dissolved gas, but it is now appreciated that in some instances the presence of a small amount of gas is actually beneficial. For example, in the production of aluminum-bronze die castings the presence of a small percentage of hydrogen reduces shrinkage and contraction troubles likely to cause "hot-tears." Due to rapid solidification of the metal the hydrogen is, of course, retained in solution. In the case of gunmetal and bronze sand castings, particularly those which are imperfectly fed, it has been found that in some instances the presence of a certain amount of gas[2] serves to disperse shrinkage-porosity more uniformly through the casting, with the result that pressure-tightness and mechanical strength are considerably improved. The effect of gas on the distribution of porosity varies considerably with different bronzes as follows:

1. In copper-tin-zinc gunmetals, tin bronzes and phosphor bronzes containing up to 0.3 per cent phosphorus the presence of a small amount of hydrogen slightly improves the distribution of shrinkage-porosity, with some resultant improvement in the properties and pressure-tightness of imperfectly fed castings.

2. Degassed phosphor bronzes containing over 0.3



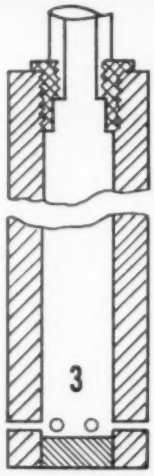
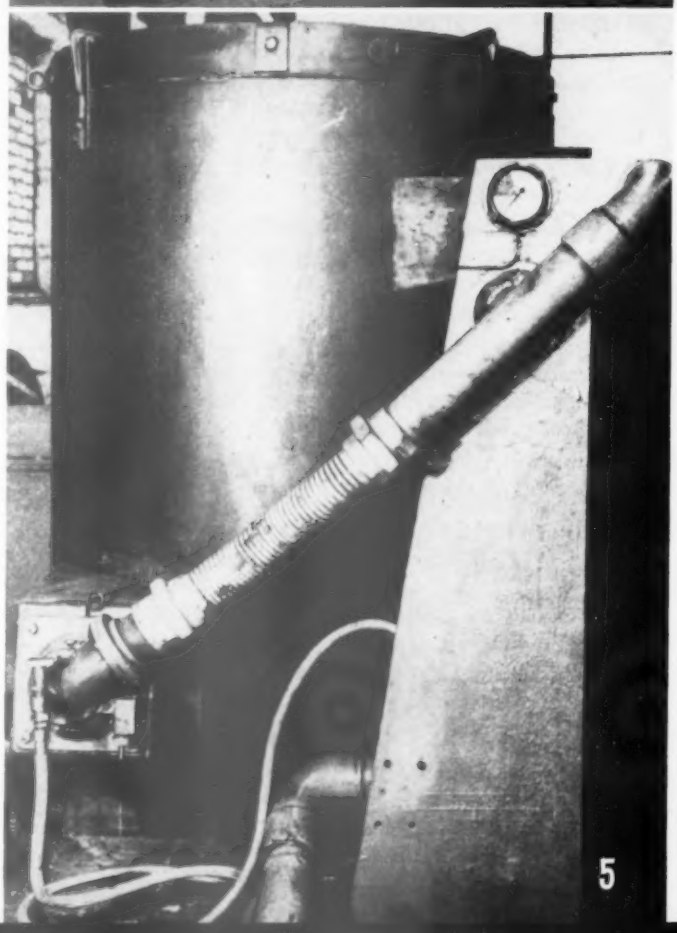


Fig. 1—Effect of added metals on the solubility of hydrogen in copper
Fig. 2—Method of gas scavenging crucible melts
Fig. 3—Section through blowing tube
Fig. 4—Lift-coil induction furnace
Fig. 5—Modern design of oil-fired crucible furnace



By FRANK HUDSON
Mond Nickel Co. Ltd., London

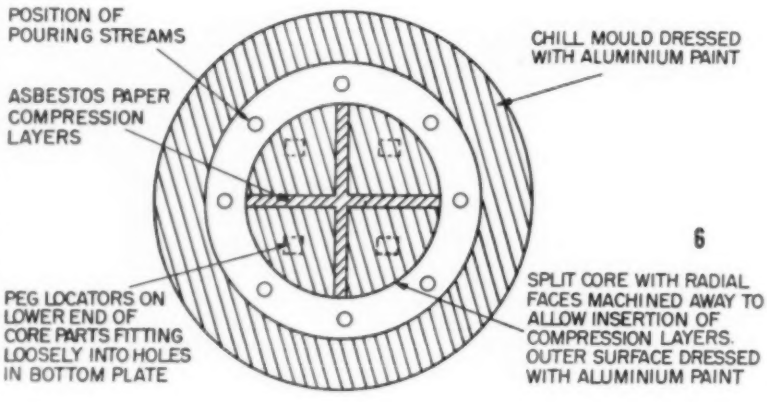
per cent phosphorus absorb a small amount of hydrogen from moisture in sand molds and this gas absorption is most effective in dispersing local concentrations of shrinkage porosity.

3. Leaded gunmetals are the best alloys for intricate castings which are not easily fed. The presence of even small amounts of hydrogen is harmful and they should, therefore, always be used in the fully degassed condition.

The solubility of hydrogen in nonferrous metals varies considerably, as shown in Table I. Many practical foundrymen are hesitant about using metals, such as nickel, capable of absorbing large amounts of hydrogen, as they think such metals are an inherent source of gassy metal. This, of course, is incorrect, and when trouble is experienced from this source it is generally due to bad production methods. The effect of various additions to copper on the solubility of hydrogen has been investigated by Sieverts[3] as shown in Fig. 1. Nickel increases the solubility, whereas it is reduced by aluminum and tin. The increased solubility for hydrogen imparted to copper alloys by the addition of nickel may account to some extent for the use of this metal by foundrymen to promote solidity in castings. In view of the above it might also be suggested that nickel additions to most gunmetal and bronze castings are likely to be beneficial in counteracting the effects of hydrogen absorption arising from reaction with mold moisture.

Brasses and other alloys containing large percentages of zinc (probably over 10 per cent) are not liable to absorb and retain hydrogen in the molten state, due to the high vapor pressure of zinc, which acts as a gas-scavenger.

Copper-nickel-zinc alloys, however, are prone to carbon monoxide gas-unsoundness, due to the reaction of carbon and active oxides in the melt, when they are melted under reducing conditions. Cupronickel and bronzes containing over 10 per cent nickel are also susceptible to the above reaction, which can be prevented by the use of strongly oxidizing melt-


POSITION OF POURING STREAMS
ASBESTOS PAPER COMPRESSION LAYERS
CHILL MOULD DRESSED WITH ALUMINIUM PAINT
6
PEG LOCATORS ON LOWER END OF CORE PARTS FITTING LOOSELY INTO HOLES IN BOTTOM PLATE
SPLIT CORE WITH RADIAL FACES MACHINED AWAY TO ALLOW INSERTION OF COMPRESSION LAYERS. OUTER SURFACE DRESSED WITH ALUMINIUM PAINT

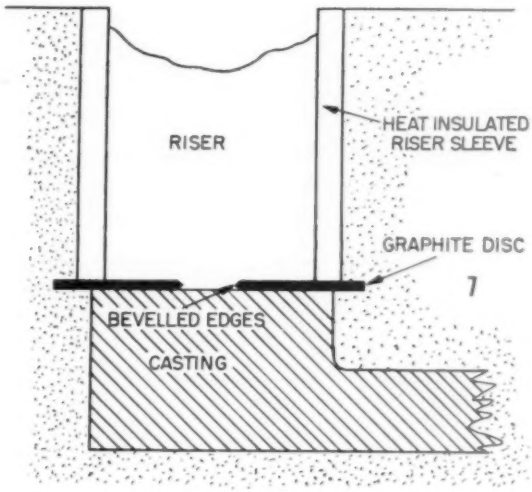
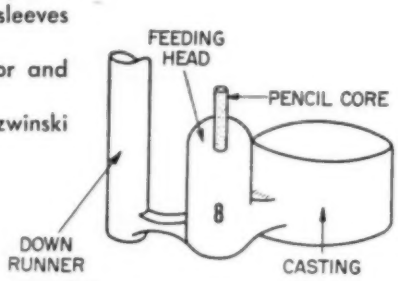


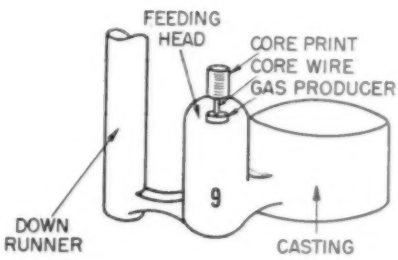
Fig. 6—Mold assembly for slow-pouring cored billet with split chill core (Pell-Walpole)

Fig. 7—Use of graphite disks and gypsum sleeves for necked risers

Fig. 8—Atmospheric feeding method (Taylor and Rominski)

Fig. 9—Gas-pressure feeding method (Jazwinski and Finch)





ing conditions.

From the practical point of view, particularly so far as the production of sand castings is concerned, it is wiser to avoid the presence of gas in the molten metal. In well designed castings which can be properly fed dissolved gas accentuates the effect of liquid shrinkage in promoting porosity and impairs mechanical properties. In badly designed castings of uneven section which cannot be properly fed the presence of a small amount of dissolved gas may prove beneficial with certain alloys. It is, however, not easy in practice to control the amount of gas required and the use of leaded gunmetals is undoubtedly to be preferred for the production of castings of varying section which have to withstand pressure. An extensive series of tests[4] conducted in Great Britain some three years ago showed that an alloy containing 7 per cent tin, 5 per cent zinc, 5 per cent lead, 3 per cent nickel, balance copper, not only gave maximum pressure-tightness, with ease of handling in the foundry, but also produced stronger castings (when tested to destruction) at lower cost than any other available commercial tin-bronze or gunmetal.

Gas control during melting—During melting, copper alloys can absorb hydrogen from several sources such as:

(*a*) The melting atmosphere, which may contain hydrogen and reducing gases. Water vapor in ordinary air, and in that used for combustion, is a common source of gas absorption.

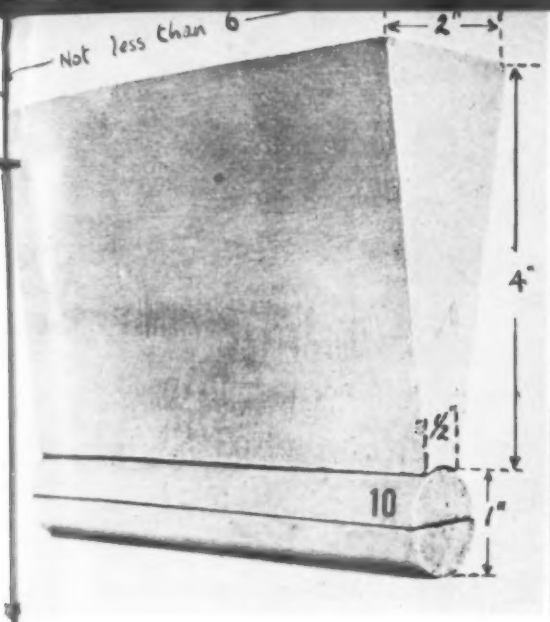
(*b*) Hydrated corrosion products, cutting-compounds, oil, etc., on the surface of the metal prior to melting.

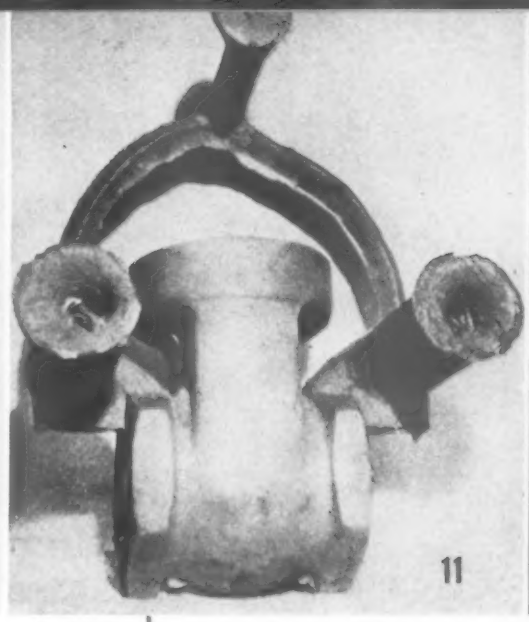
(*c*) The presence of hydrogen in the metal used for the basis of the furnace charge—e.g., cathode copper, remelted ingots and scrap.

Until recently the most successful method for counter-acting hydrogen absorption during melting, was to melt as rapidly as possible in a slightly oxidizing atmosphere (0.2-0.8 per cent free oxygen), using a covering slag or flux which evolved oxygen on heating, and to follow by deoxidation with phosphor-copper. Materials such as manganese dioxide (in the form of manganese ore), black copper oxide, nickel oxide, etc., are suitable for this purpose. Alternatively, a flux[5] containing 1 part fused borax, 4 parts sand, 5 parts cupric oxide by weight can be recommended. It is claimed that this flux does not attack graphite crucibles. The amount of flux employed should be between 0.75-1.5 per cent of the total metal charge and sufficient to completely cover the surface of the molten metal.

The results obtained by this oxidation-reduction method are, however, affected by the type of material being melted. In the investigations conducted by the British Non-ferrous Metals Research Association,[6] it has been shown that while plain copper-tin bronzes can be successfully degassed by an oxidation-reduction process, the presence of phosphorus and of zinc (to a lesser extent) prevents satisfactory results being obtained.

The presence of phosphorus lowers the solubility of oxygen in the melt and so hinders degassing by oxidation. Copper-tin alloys containing small amounts of phosphorus—e.g., up to 0.05 per cent can be conveniently degassed by oxidation provided that the





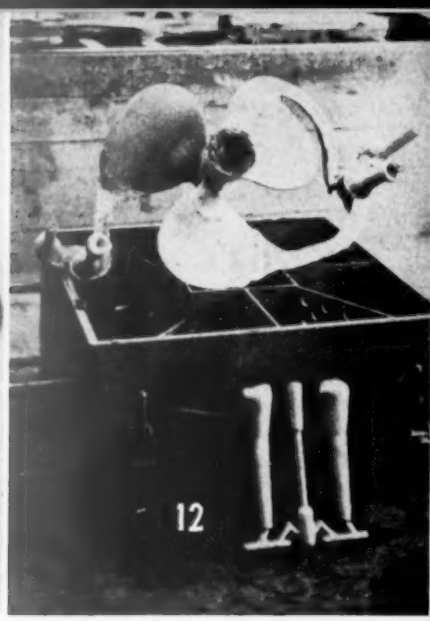


Fig. 10—Standard form of test bar

Fig. 11—Satisfactory method for running gun-metal and tin-bronze castings

Fig. 12—Satisfactory method for running aluminum-bronze castings

TABLE I—Solubility of Hydrogen in Some Non-ferrous Metals

(760 mm. Hg pressure of H_2)

Metal	Solubility of H_2 in c.c.s. (NTP)/100 gm. Metal at:— Solidus	Liquidus	100° C. above Liquidus	200° C. above Liquidus
Copper	2·0	5·3	10·0	14·0
Nickel	18·5	39·0	41·0	
Aluminum .	Practically nil	0·2	0·6	1·4

(Courtesy of The British Non-ferrous Metals Research Association.)

TABLE II—Suggested Gases for Scavenging Various Alloys

Alloy	Scavenging Gas
Phosphor bronze	Dry Nitrogen.
Aluminum bronze.	
10–12% Tin-bronze.	Dry Air.
High nickel tin-bronze.	
88/10/2 Gunmetal.	
86/7/5/2 Gunmetal.	
83/7/5/5 Gunmetal.	
85/5/5/5 Gunmetal.	
Nickel silver (under 10% zinc).	
Cupro nickel.	
Yellow brass.	Degasification not usually required.
High-tensile brass.	

TABLE III—Maximum Amounts of Phosphorous Required To Deoxidize Degassed Tin Bronze

Degassing Medium		% Phosphorus Required
Manganese ore at bottom of crucible		0·04
Flux cover	1 part cupric oxide. 2 parts sand. 2 parts Borax.	0·06
Flux cover	1 part cupric oxide. 1 part sand. 1 part Borax.	0·08
Scavenging with dry air.		0·08

phosphorus is eliminated in the oxidation. It is, however, impracticable to remove large amounts of phosphorus by oxidation, and copper-tin-phosphorus alloys should be degassed by scavenging with dry nitrogen or air, or by the addition to the charge of substances which evolve inert gases during melting. Manganese ore, marble chips, etc., are fairly effective in this direction, providing they are charged at and remain on, the bottom of the crucible. When added to the surface of the melt, or mixed with fluxing agents, they do not act so well.

The presence of zinc has the same effect as that of phosphorus, but to a lesser degree. Alloys containing up to 1.0 per cent zinc can be rapidly degassed by oxidation-reduction treatment. With higher zinc contents this treatment gives melts with a low gas content which is probably sufficiently low for most purposes, although they are not completely degassed. Complete degasification, however, can be effected by the gas-scavenging methods mentioned previously, although the evolution of zinc fume makes the process rather objectionable unless suitable precautions are taken.

Degasification by gas scavenging shows considerable promise as compared with the oxidation-reduction method utilizing slags and fluxes. The former is a much cleaner operation, is less severe on crucibles and furnace-linings and can be easily applied on a practical basis in the foundry. There is no need to dry the air or nitrogen if these are taken from cylinders at pressures exceeding 20 atmospheres. The gas is bubbled though the superheated metal, just before pouring, for a period of about 5 minutes, by means of a steel or refractory tube, as shown in Figs. 2 and 3. The rate of gas-flow (500-600 litres per hour) must be sufficient to cause a fairly violent disturbance of the metal. Some allowances should also be made for the cooling effect of the gas on the molten metal, which should be superheated to a higher temperature than normal. After the scavenging treatment the metal must, of course, be deoxidized in the usual manner. Suggested gases for treating various alloys are outlined in Table II. In view of the increasing use of electric furnaces in the brass foundry it may be interesting to (*Please turn to page* 172)

Aluminum

Melting operations are discussed in this fourth of a series of articles based on a survey sponsored by the Foundry Division of the Aluminum Association

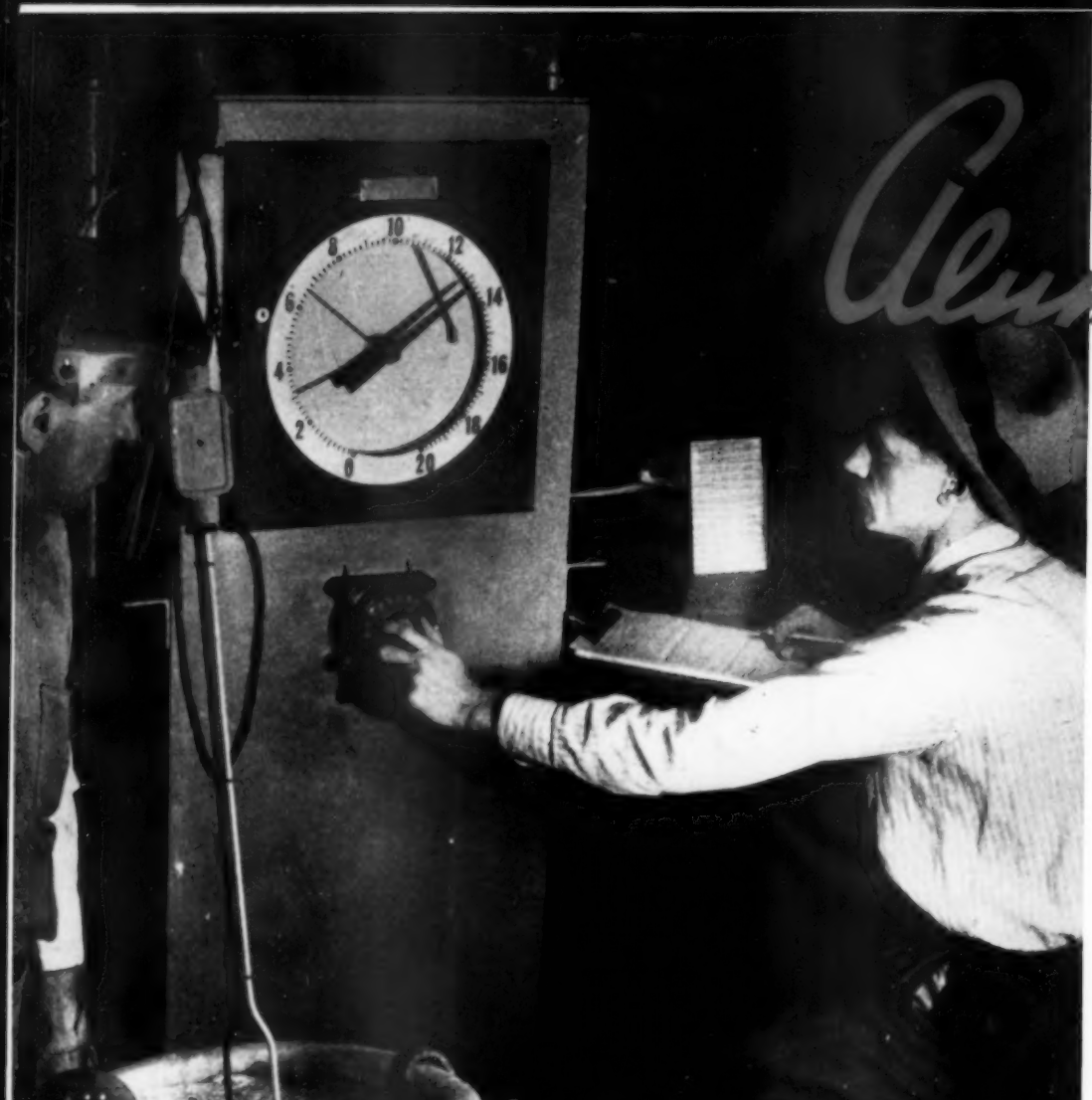


Fig. 1—Checking and recording pouring temperatures for molten aluminum at control station conveniently located on foundry floor

Fig. 2—Pouring aluminum pigs

Alloy Castings

By FLOYD A. LEWIS
Technical Consultant
Aluminum Association

GOOD quality in aluminum castings probably depends more on the melting and pouring procedures than on any other foundry operations. Indeed it has been estimated[1] that at least 50 per cent of all serious metal difficulties in commercial practice can be traced to improper melting and pouring.

Although the most careful procedure meticulously carried out will not always avoid the production of some inferior metal, strict adherence to recognized practices, especially with regard to some of the more important details, will go a long way toward assuring uniformly sound castings. One of the most important requirements is accurate temperature control throughout the entire melting and pouring procedure.

Two troublesome factors that must be guarded against are (1) the tendency of molten aluminum to absorb and dissolve hydrogen and (2) oxidation. Dissolved hydrogen is liberated upon solidification, thereby causing porosity, and oxide may become trapped in the melt—resulting in inclusions in the finished castings. Fortunately, measures taken to avoid the absorption of hydrogen also minimize oxidation, and vice versa. Proper temperature control is especially important here, as both tendencies are more pronounced the higher the temperature.

Accurate temperature control is important also from the standpoint of grain size. Heating the molten aluminum to a high temperature increases the grain size markedly; even though the temperature of overheated metal is reduced before pouring, some of the adverse effects on grain size are retained. Holding the melt for long periods at even moderately elevated temperatures likewise increases grain size.

As molten aluminum reacts with moisture to produce hydrogen, which is dissolved, and oxygen, which oxidizes the metal and produces dross, it is desirable to keep the furnace atmosphere as dry as possible when making castings subject to pinhole porosity. In these cases best results are obtained with furnaces in which heavily moisture-laden combustion gases do not come in contact with the melt. In some instances, particularly for castings required to be free from pinhole or gas porosity, it may even be desirable to provide a dry air or inert gas atmosphere in the furnace.

Because molten aluminum has a tendency to dissolve iron, precautions must be exercised to avoid contamination from iron melting pots and ladles and other iron equipment. This action is minimized by maintaining low melting temperatures and a protective coating on all iron surfaces with which the metal comes in contact. Contamination from other sources can be avoided by general cleanliness about the foundry equipment, especially that coming in contact with the molten metal.

Melting Furnaces—Selection of furnaces for melting aluminum alloys involves considerations of both economy and quality in the finished castings. In general, operating flexibility is more important than cost. In additon, the furnaces must be designed to minimize the solution of hydrogen and oxidation troubles, because good casting qualities depend so heavily on keeping these two factors effectively under control. In fact, it may be necessary to sacrifice melting efficiency and capacity in order to obtain satisfactory performance with respect to these two factors.

For large capacities, the open-hearth or barrel type furnace may be used, especially for alloying purposes where the metal is cast in ingot form for subsequent remelting and casting in final form. These furnaces also are suitable for melting scrap which is to be cast in ingot form. Because the combustion gases pass over the surface of the melt, open-hearth furnaces must be operated at relatively low temperatures to minimize gas absorption. In addition, it is particularly desirable to avoid agitation that will disturb the surface enough to break the protective oxide film.

Select Suitable Melting Furnace

Indirect-fired melting furnaces of the iron-pot or crucible type are best adapted for general use in aluminum foundries and are most widely used. They may be of the stationary type from which the molten metal is ladled by hand, or the tiltable type which allows the metal to be poured into the ladles. In small units, the pot or crucible itself is lifted from the furnace and the metal is poured directly from it into the molds, special tongs and handling devices being provided for this purpose.

Capacities of pot-type furnaces range from about 25 to 2000 lb, 400-lb units being of a convenient size for a wide range of foundries. A 400-lb unit should melt about 2000 lb of metal in an average eight-hour day. It is better in general to work with a larger number of relatively small furnaces than a smaller number of large units, to avoid holding any part of a charge at pouring temperature for a long period.

Iron pots are used most often, but graphite or refractory crucibles sometimes are employed for alloys such as the aluminum-silicon or aluminum-magnesium series where iron pickup must be minimized to retain

the highest mechanical properties or resistance to corrosion. Iron pots have the advantage of better heat transfer, but care must be exercised to keep them thoroughly covered with a protective coating to minimize iron pickup.

Because these coatings are difficult to maintain intact, and because the majority of alloys suitable for permanent mold work contain silicon as a major alloying element, the use of refractory pots or crucibles is coming into increasing favor in permanent-mold foundries. Pots of the clay-graphite and silicon-carbide types are quite satisfactory. Although they are considerably more expensive than iron pots, they do not need to be coated and their higher cost usually is justified by the resultant improvement in product and reduction of scrap.

Where pot-type furnaces are employed in permanent-mold operations, separate melting and holding furnaces must be used for high rates of production on a quality basis. Relatively large open-hearth furnaces usually are employed for melting purposes, the metal being transferred to smaller pot-type holding furnaces at the pouring stations. This arrangement also is used in large sand foundries. Some foundries use smaller open-hearth furnaces for both melting and holding purposes.

The majority of foundrymen perhaps will visualize only large-capacity units when the open-hearth furnace is mentioned. However, smaller units with capacities of a few hundred pounds up to a ton or two are entirely practical. As used for both melting and holding purposes, these furnaces have a charging well at one end and dipping wells on one or two sides. One such furnace sometimes feeds as many as six pouring stations at one time. Charging, fluxing and skimming are all done in the charging well, so that clean metal enters the main part of the furnace. Thermocouples in the dipping wells control the furnace burners, assuring delivery of metal at the desired temperature at all times.

In permanent mold foundries, where pouring is done on a continuous basis, charging also is done continuously. Since a relatively large amount of molten metal is in the furnace at all times, charging ingots and scrap preheated to at least 500°F at a predetermined continuous rate will not lower the temperature of the metal to any marked degree. It is possible to adjust the charging rate so that there is extremely little variation in the pouring temperature.

The use of an open-hearth type of furnace, of course, increases the likelihood of gas absorption and oxidation difficulties because of the exposure of the molten metal to the combustion gases. Where pouring temperatures can be kept low, however, as they can in many permanent-mold operations, this type of furnace will give quite satisfactory results with normal gas fluxing. If pouring temperatures must be kept above 1350°F, transfer of the metal to a pot-type furnace followed by additional gas fluxing usually will produce better results. (Fluxing procedures are discussed in a subsequent section of this article.)

Choice of Fuel—Gas, oil, and coke are the fuels ordinarily used in aluminum foundries, with gas and oil by far the most common because of their greater flexibility. In many instances coke is more econom-

TABLE I—Nominal Composition of Standard Rich Aluminum Alloy

Per Cent of Alloying Elements (Remainder Aluminum)							
Fe	Si	Cu	Mg	Ni	Mn	Cr	Ti
10.0	...	...	..	...	..	..	..
50.0	...	...	..	...	..	..	..
...	5.0	...	..	...	..	..	..
...	12.0	...	..	...	..	..	..
...	10.0	...	..	...	..	..	0.2
...	...	18.0	..	...	..	..	..
...	...	40.0	..	...	..	..	..
...	...	...	1.0	...	..	..	..
...	...	...	..	25.0	..	..	..
...	...	...	..	10.0	..	..	..
...	...	...	..	...	5.0	..	..
...	...	...	..	...	..	2.5	..

ical but is not adaptable to accurate temperature control. Choice between gas and oil usually depends on comparative costs, which vary somewhat in different localities. A careful study of local conditions will indicate which to choose in any given locality.

For either gas or oil, burners having automatic control of the so-called high-low type are most satisfactory. The high flame is used for the initial heating and melting period, after which the low flame is sufficient to hold the melt at pouring temperature. The use of such units reduces the danger of overheating and minimizes temperature fluctuations during the holding period.

Electric furnaces have been used to only a limited extent in aluminum foundries. Although electricity has the obvious advantages of cleanliness, absence of combustion gases, and complete flexibility and high accuracy of control, the relatively high costs of both the furnace units and the energy have militated against it. Resistance arc and high-frequency furnaces have been used to a very limited extent, but low-frequency induction furnaces are finding increasing use because of their low energy costs per pound of metal melted.

The heat is produced within the body of the metal and the efficiency therefore is high. The slight agitation of the metal by the current prevents segregation. As there are no external heating devices in this type of furnace, the heat radiated to the casting room is very small compared with fuel-fired furnaces, with consequent improvement in working conditions.

Like all other types of equipment, of course, the induction furnace has its disadvantages. It can be started only by filling the metal chamber with molten metal. The metal must be kept liquid at all times, and the chamber must be completely emptied when shutdown becomes necessary. Also shutdown may result in cracking the monolithic furnace lining. The disadvantage of keeping the metal molten is less serious in plants employing two shifts and, of course, disappears completely in 24-hour-a-day operations.

Temperature Control—Without proper means for measuring and controlling the temperature of the molten metal at all stages of the casting process, the best of equipment and methods may produce inferior castings. Overheated metal has a coarser grain size and more gas porosity upon solidification than metal that has been processed at the proper temperatures, even though the overheated metal may have been cooled before pouring. Holding the molten metal at even moderately high temperatures for relatively long periods also will coarsen it; the higher the temperature, the shorter the time required for the coarsening to take place.

Maintenance of uniform furnace temperature is difficult at best, but automatic control is of considerable assistance in this problem. Automatic control is readily arranged where either gas, oil, or electricity is the fuel, and with either gas or oil the high-low arrangement is the most satisfactory type, as mentioned previously. An adjustable on-off control actuated by a thermocouple immersed in the melt will control the high flame. A bypass around the high-flame control will pass sufficient fuel to maintain the low flame. This may be adjusted manually to a point where the low flame at no time can cause overheating.

Thermocouple elements of the chromel-alumel type have been found to be highly satisfactory for furnace temperature control. These are inserted in protective iron or silicon carbide tubes and the whole assembly suspended so as (*Please turn to page* 232)

Fig. 3—Aluminum alloy for small castings being ladled from 300-lb stationary iron pot furnace provided with accurate temperature control

The Gray

By RAYMOND L. COLLIER
Executive Vice Preisdent
Gray Iron Founders' Society

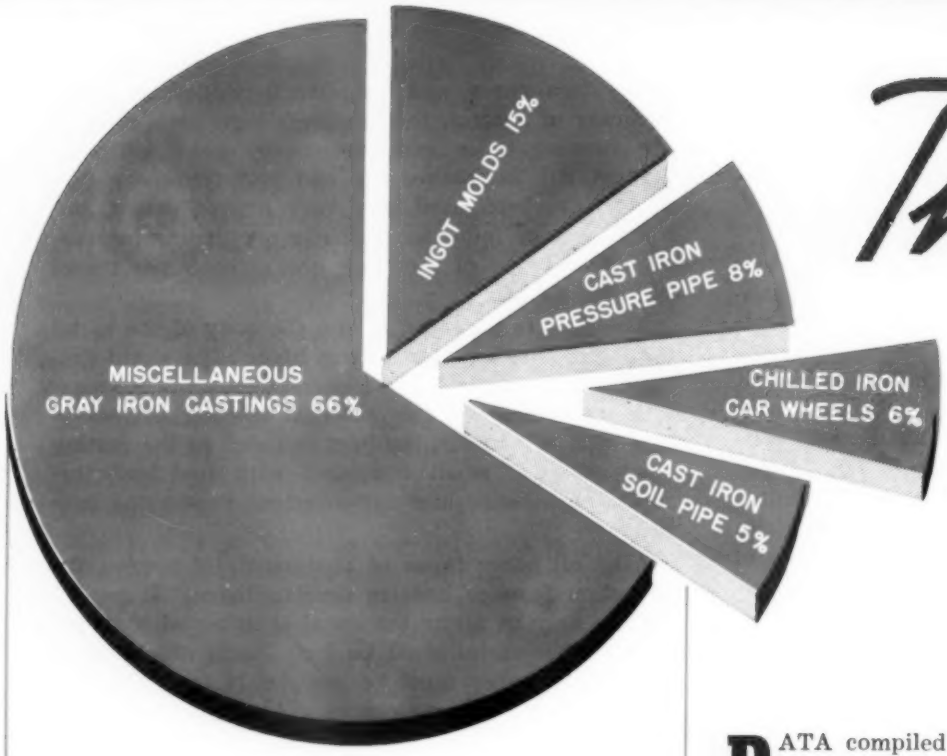

INGOT MOLDS 15%
CAST IRON PRESSURE PIPE 8%
CHILLED IRON CAR WHEELS 6%
CAST IRON SOIL PIPE 5%
MISCELLANEOUS GRAY IRON CASTINGS 66%

Fig. 1 (top left)—Shipments of gray iron castings by main divisions (first ten months, 1947—Bureau of the Census)

DATA compiled by the Bureau of Census, Washington, and presented in Table I, show that gray iron foundries are located in every state except Wyoming. Over 20 per cent of all gray iron foundries are located in two states: Pennsylvania and Ohio. Over 55 per cent of the total are located in eight industrial states—Pennsylvania, Ohio, Illinois, Michigan, New York, California, Indiana and Wisconsin—each of which has over 100 foundries.

Excluding foundries which are exclusively producers of chilled cast iron railroad car wheels, ingot molds for steel mills, and cast iron pressure and soil pipe, there are 2521 gray iron foundries in the United States. These companies are engaged entirely or in part in the production of miscellaneous commercial gray iron castings with which this report is principally concerned.

Dun and Bradstreet Inc. advised that they have record of only four foundry failures in 1945 and none in 1946. Some of these failures might have been for other types of foundries, as their records do not break down the number of foundry failures by types. These

TABLE I—Number of Gray Iron Foundries in the United States, Active in December, 1946

Alabama	81	Nebraska	13
Arizona	4	Nevada	1
Arkansas	9	New Hampshire	16
California	130	New Jersey	80
Delaware	4	New Mexico	1
Connecticut	51	New York	158
Colorado	23	North Carolina	49
Florida	17	North Dakota	2
Georgia	59	Ohio	260
Idaho	6	Oklahoma	16
Illinois	181	Oregon	31
Indiana	122	Pennsylvania	300
Iowa	52	Rhode Island	13
Kansas	31	South Carolina	18
Kentucky	20	South Dakota	2
Louisiana	21	Tennessee	62
Maine	22	Texas	59
Maryland	22	Utah	16
Massachusetts	96	Vermont	14
Michigan	162	Virginia	58
Minnesota	64	Washington	39
Mississippi	10	West Virginia	22
Missouri	48	Wisconsin	112
Montana	6		
		TOTAL	2,583

Source: Bureau of the Census, Washington.

TABLE II—Cumulative Increase in Number of Gray Iron Foundries by Decades

Year or Decade	Jobbing Foundries: Businesses Started	Jobbing Foundries: Foundries Started	Jobbing Foundries: Cumulative Total No. Foundries	Captive Foundries: Businesses Started	Captive Foundries: Foundries Started	Captive Foundries: Cumulative Total No. Foundries	Total: Businesses Started	Total: Foundries Started	Total: Cumulative Total No. Foundries
1813	1	1	1	..	..	..	1	1	1
1813-1820	2	1	2	..	..	..	2	1	2
1821-1830	1	0	2	1	0	0	2	0	2
1831-1840	7	8	10	1	1	1	8	9	11
1841-1850	10	10	20	3	2	3	13	12	23
1851-1860	12	9	29	11	8	11	23	17	40
1861-1870	16	14	43	4	4	15	20	18	58
1871-1880	25	22	65	11	9	24	36	31	89
1881-1890	45	43	108	9	9	33	54	52	141
1891-1900	56	44	152	19	13	46	75	57	198
1901-1910	81	83	235	14	20	66	95	103	301
1911-1920	99	104	339	7	11	77	106	115	416
1921-1930	65	68	407	6	9	86	71	77	493
1931-1940	45	53	460	2	2	88	47	55	548
1941-1947	31	36	496	1	1	89	32	37	585

TABLE III—Organizational Structure of 562 Gray Iron Foundries

Organizational Structure	Jobbing Foundries: No.	Jobbing Foundries: % of Total	Captive Foundries: No.	Captive Foundries: % of Total	All Foundries: No.	All Foundries: % of Total
Corporations	389	82	83	93	472	84
Partnerships	56	12	2	2	58	10
Individual ownership	28	6	4	5	32	6

TABLE IV—Percentages of Output Sold As Commercial Jobbing Castings—623 Gray Iron Foundries

Percent of Output Sold in Open Market	Jobbing Foundries	Captive Foundries
100%	275	..
90 to 99	54	..
80 to 90	24	..
70 to 80	33	..
60 to 70	25	..
50 to 60	20	..
40 to 50	22	..
30 to 40	13	..
20 to 30	21	..
10 to 20	30	..
5 to 10	18	..
3	..	1
2	..	5
1	..	8
0	..	74
Totals	535	88

Iron Castings Industry

This is the first of two articles giving a general description of the gray iron castings industry. They represent part of an unusually comprehensive survey-report completed recently by the Gray Iron Founders' Society

facts indicate that the number of foundries shown here probably need not be corrected for defunct foundries.

Growth of the Industry—Reports were received in this survey from 585 foundries giving the years in which their companies were organized and the years when their foundries started operating. Table II shows the growth of the industry by decades, covering 585 gray iron foundries.

The most rapid growth of captive foundries took place between 1900 and 1930, which is the only period during which the number of captive foundries started exceeded the number of business starts. Almost exactly two-thirds of the 585 reporting foundries commenced operations since the beginning of the century. The greatest decade of growth was recorded in the period which included World War I. New starts since that time have steadily continued to decline.

The oldest jobbing foundry was reported to have started operations in 1813; the first captive foundry in 1837. It is remarkable that about 5 per cent of the 585 reporting foundries have been in operation for over 100 years.

Organizational Structure—Most gray iron foundries are incorporated. Only one in six has a partnership form of organization or is individually owned. As would be expected, more captive foundries are operated by corporation than in the case of jobbing foundries. Table III shows the analysis of organizational structure of 562 gray iron foundries, the most interesting feature of which is the fact that 18 per cent of the jobbing foundries are individually owned or operated as partnerships—a rather high figure for a manufacturing industry.

Jobbing and Captive Foundries—According to the Bureau of Census "Facts for Industry" report on gray iron castings for 1946, there were in December, 1946, 1342 strictly jobbing foundries, 488 exclusively captive foundries, and 753 foundries producing gray iron castings both for own use and for sale. The fact is that many so-called captive foundries accept or solicit outside business when the casting requirements of their owning companies fall below what is considered to represent an economical operating volume. The point at which nominally captive foundries solicit open market castings business is determined by individual company policy.

Thus a foundry can shift from a captive rating to a commercial jobbing rating, or vice versa, depending upon market conditions and company policy. For the purpose of this report any company selling as little as 5 per cent of its output in the open market is not considered captive inasmuch as the competition created by even so small a volume of business can have a significant effect on the commercial market. To a considerable degree the problems of captive foundries are the same as those of jobbing foundries, hence an exact statistical enumeration is largely of academic importance.

The Bureau of Census does report shipments of captive foundries separate from those of jobbing foundries, and while there is probably some degree of error in the reported figures, the record shows that approximately 42 per cent of all gray iron castings produced are made in (*Please turn to page* 206)

TABLE V—Weekly Production Capacity of 611 Gray Iron Foundries Based on a Standard 40-hour Week

Item	Jobbing Foundries	Captive Foundries	Total
Number	516	95	611
Weekly capacity, net tons	46,542	12,594	59,136
Annual capacity, net tons	2,327,100	629,700	2,956,800
Average weekly capacity	90.2	132.6	97.0

TABLE VI—Normal Production Capacity of 602 Gray Iron Foundries Based on Actual Work Schedules, Second Quarter, 1947

Item	Jobbing Foundries	Captive Foundries	Total
Number	507	95	602
Weekly capacity, net tons	62,177	18,948	81,125
Annual capacity, estimated	3,108,850	947,400	4,056,250
Average weekly capacity	123.0	199.0	135.0

TABLE VII—Actual 1946 Production of Gray Iron Castings by Types of Castings Produced—569 Gray Iron Foundries

Type of Castings Produced	Jobbing Foundries Number	Jobbing Foundries Net Tons	Captive Foundries Number	Captive Foundries Net Tons	Total Number	Total Net Tons
Commercial grades	467	1,315,585	77	528,309	544	1,843,894
Special high test	171	301,188	20	95,396	191	396,584
TOTAL		1,616,773		623,705		2,240,478

TABLE VIII—1946 Production of Foundries Participating in Survey

Jobbing Foundries Number	Jobbing Foundries Production, N.T.	Captive Foundries Number	Captive Foundries Production, N.T.	Total Number	Total Production, N.T.
486	1,616,773	83	623,705	569	2,240,478

Questions and Answers

Aluminum Alloy Contains Gas

Q.—We are enclosing a sketch of an aluminum casting with which we are having trouble due to porosity, and in addition are forwarding a section of one of the risers to illustrate the condition. The aluminum was poured at approximately 1300° F.

A.—Examination of the section of the riser sent to us shows it to be full of small holes ranging in size from pinholes up to 1/16-in., and in our opinion they are the result of the aluminum alloy being gassed. Presumably you are melting in oil-fired crucible furnaces, and it is suggested that you check your burner conditions to see that you are using a short sharp flame instead of a long smoky or yellow flame. Possibly you may be using some oil-covered scrap, and if so it will be wise to burn off the oil prior to use. Again, if your raw materials are left lying out in the open without protection they can pick up enough moisture to cause trouble. Also the molten metal should not be allowed to remain in the furnace to stew, but should be removed as soon as it has reached the desired pouring temperature. Possibly you may be able to overcome the trouble by use of one of the numerous degasifying fluxes available.

As far as gating the ring casting is concerned, we believe that you will find it much simpler to use a center sprue with four radial branches, and four rectangular risers at the top of the ring over the points of entrance of the gates located at the bottom of the casting cavity. Alternatively, you might follow your present practice of placing all of the ring in the drag with the branch gates leading into the top of the cavity. To avoid extreme height between ladle lip and sprue opening with a central sprue, use a runner box across the top of the mold.

Pin Holes Show on Cope Side

Q.—We are forwarding a section of a small gray iron casting and will appreciate your opinion on the cause of the pinholes that appear on and just under the surface of the casting. This form of defect appears only occasionally, but when it does appear it is found in all the castings from that day's heat.

A.—Large blow holes in certain castings, or small pin holes as in the present instance, may result from various causes—wet or hard sand, high clay content, lack of proper vents, wet ladle linings, and oxidized or burned metal. Since this form of defect in your shop appears only occasionally, we may eliminate the wet or hard sand, high clay content, lack of proper vents and wet ladle linings. The sand in one or two heaps possibly might be too wet or rammed too hard, but it is outside the bounds of probability that all the sand in the shop should be in that condition on any given occasion. The same line of reasoning applies to an excess of clay, lack of vents, or wet ladle linings. The lining of a ladle might not be dry on the first round, but on the second round, it should be quite satisfactory.

Oxidized or burned metal produces a definite type of gas hole, not confined to a space under the cope, or close to the inner or outer wall of the mold, but scattered all through the casting. Defects in the casting submitted are not in that classification. Therefore, we are reduced to the only remaining factor, gas in the metal from some cause outside the method of melting. Without an actual examination, and venturing a long-distance diagnosis, we are inclined to the opinion that aluminum in your scrap charge in the cupola is the immediate cause of your trouble. In the present unsatisfactory condition of the scrap market, several investigations of a problem similar to yours have led to the conclusion that aluminum pistons in auto cylinder blocks have produced pin holes in the resulting gray iron castings.

Zinc Oxide Coating Builds Up

Q.—We are casting yellow brass and manganese bronze in permanent molds, but are having trouble with a white coating of zinc oxide building up on the mold walls. We are using a carbon mold coating which gives a smooth surface on the castings at first, but after the zinc oxide coating builds up the castings become rough. It is difficult to remove the built up coating. Have you any suggestions to prevent formation of the coating?

A.—Due to the comparatively low boiling point of zinc, it is necessary to melt and pour zinc-bearing alloys at the lowest possible temperature at which sound castings free from cold shuts may be obtained. Hence, we suggest that you look into that question, and experimentally determine the most suitable range. Due to volatilization of zinc fumes, the alloys should be poured "hard and fast," in foundry parlance, so that the mold is filled as quickly as possible, and to that end the gating system often has a larger cross-sectional area than in the case of red brasses. In some instance 1 to 2 per cent aluminum is added to yellow brasses to suppress in some degree the evolution of fumes. However, the aluminum oxide skin which is formed may result in inclusions in the casting, and considerable care has to be exercised in designing a gating system which prevents turbulence.

While you mention the use of a carbon mold coating, you did not state whether it is applied directly to the mold or upon a clay or other refractory coating. Possibly you may find less difficulty in cleaning off the deposit by using such an undercoating. Evidently, while the deposit occurs on the first cast, it does not interfere until some time later. Therefore, it seems advisable to clean the

molds at intervals of a definite number of pourings. Method of cleaning will depend on the adherence of the deposit. Perhaps by blowing out the mold with a strong air blast after each pour, the deposit can be removed without trouble. Again you may have to use a stiff wire brush at intervals.

Brass Casting Needs Feeding

Q.—We are sending for your consideration a brass roller bearing retainer made from 85-5-5-5 alloy ingot. Casting was poured at approximately 2100°F; fluxed with 3 oz of 15 per cent phosphor-copper per 100 lb metal. It was poured through a skim gate with the casting gate 50 per cent larger than the thinner section of the casting. Riser was about 2 in. diameter and 4 in. high. We feel that the porous condition in the pockets is due to some extent to the method of machining. Condition only shows up in the larger diameter pockets; the small holes, countersinking and turned surfaces are quite satisfactory for customer's requirements.

A.—Visual examination of the torn surfaces in the pockets, as you term them, indicated that trouble was not in the method of machining, but to the internal condition of the metal. That belief was verified after fracturing the casting in several places at the thin sections and also at the heavier projections. Fractures in the thin section show widely distributed dark brown discoloration, while in the heavy section it appears lemon yellow. In both the feathery pine-tree or dendritic formation with numerous voids was present —conclusive evidence that the sections were not fed sufficiently.

While you give some information about the gates, you do not indicate the complete gating system. Presumably the sprue is in the center with channels or branches to the flange. We suggest that you use six radial branches leading to the flange and gated between alternate pairs of legs or projections. Gate should be about as thick as the flange at point of attachment, and about 1 in. wide. You also might try reducing your pouring temperature and see what effect it has.

Porous Area in Cylinder Head

Q.—We are sending you a blueprint of a large cylinder head for a press with which we are having some difficulty. The heads appear sound as cast, but after machining cavities or porous areas are disclosed on the bore section which frequently cause leakage, and we believe they are due to shrinkage. We are using risers 6 in. diam and 12 in. high over the section. Risers are churned and hot metal added without success. We are using 60 per cent cast iron scrap and 40 per cent pig iron containing 2.75 per cent Si. Metal for the mold is transferred from the receiving ladle to a cold ladle, and is not too hot when poured.

A.—While there is a possibility that the faulty areas you mention may be due to shrinkage, our opinion is that they are due to core blows. Hence, we suggest that you place a good sized hole in the center of the core, and see that it is vented to the outside of the mold. Possibly the core may be considerably denser than you imagine, and it may be well to check over the mixture to see that an open structure or permeable core is produced.

Use of cold iron is not conducive to producing sound castings, and we believe that it will be worth your while to see that the pouring ladle is as hot as you can get it before putting iron into it. We do not believe that the risers you are using are of any great value since the cold iron in the first place is much colder when it appears in the riser and has little feeding qualities even though you churn and add hot metal. That is indicated by the large size of the risers employed. Our suggestion would be to place three or four vertical or pop gates equidistant around the heavy central section of the casting and pour into a circular runner box connecting them together. While that means more work than with the side-arm gating method, it will get the hot metal where it is needed the most, and also eliminate the large risers you are using.

Properties Are Not Related

Q.—Could you inform us if there is any definite relation between hardness and shrinkage in cast irons and steels? What general effect do carbon, silicon, manganese, vanadium and similar metallic additions have upon hardness and shrinkage? In cooling an ingot of metal what is the effect of the time element? Is there any rapid method of dissipating or absorbing the heat more readily?

A.—So far as we know there is no relationship between hardness and shrinkage or solid contraction in cast iron. The latter depends largely upon the amount of graphite present so that contraction is least with soft gray irons and greatest with white fracture irons. It so happens that the high graphite irons usually have low hardness while the white irons

GANGWAY! By J. A. PATTERSON

"Two quarts as usual, Mr. Hapgood?"

containing no graphite have high hardness, and one might generalize and say that as hardness increases shrinkage increases. However, iron cast in a metal mold will be much harder than when cast in sand, due to the structural change caused by the rapid cooling which prevents or slows down the precipitation of graphite. Also, a certain iron cast into a heavy section may be soft and open while in a thin section it may be quite hard—again due to cooling conditions. Slow cooling permits the precipitation of graphite and rapid cooling hinders it.

With reference to the effect of carbon, manganese, vanadium, etc. in cast iron, the effect on hardness and shrinkage can only be described in terms of their effect on structural composition, and since it would require considerable space just to touch upon them, we suggest that you get a copy of *Cast Metals Handbook*.

Your mention of the effect of time element is not quite clear, but if by that you mean cooling rate, it has been referred to previously. Most common method of abstracting heat from molten metal is through the use of pieces of metal known as chills. In making cast iron rolls, for example, the entire casting cavity is formed of circular metal chills several inches thick which results in a hard, white fracture "skin" a couple of inches deep; the interior being gray fracture iron. Other applications of chills are to obtain more rapid cooling in certain sections of a casting. For example, in a casting with a heavy section situated so that it cannot be fed properly by a riser, a metal chill of suitable thickness is placed at that point to cool the metal so that it solidifies at the same rate as adjoining thinner sections. In that case the thickness of the chill used is such that the casting has a gray structure.

More Coke with Steel Charges

Q.—Due to the present shortage of pig iron and cast scrap we have been melting a considerable amount of steel, ranging up to 60 per cent, in our 36-in. ID cupola. Our castings ranged in weight from 25 to 600 lb. Scrap loss is exceptionally high on account of cold metal. We shall appreciate information on the proper weight of charges, coke and iron, that will result in hot metal at the spout.

A.—Proper operation of a cupola is based on three main factors—weight of iron and coke, and volume or weight of air. These three must synchronize in definite proportion. However, coke varies in carbon content, and air varies in oxygen content, and these variations must be taken into account and suitable adjustment made. Where the charge is made up largely of steel, the usual amount of coke must be increased, because the steel absorbs a certain amount of the carbon that under ordinary conditions would be available as fuel. A brief answer to your inquiry would be to charge 700 lb iron, 100 lb coke, and blow 2000 cu ft of air per minute. This calculation assumes that the coke has a carbon content of at least 80 per cent.

Extensive studies have shown that the bed should not be lowered more than 4 in. with each charge. This gives a basis for calculating the weight of each charge. An easy method of determining this point is to erect a row of fire brick on edge on any convenient board or plate. The brick forms a ring the same as the inside diameter of the cupola. This is filled level full with coke, and the coke is weighed. Assuming that the coke weighs 100 lb, the resulting iron and coke charges will be 1000 and 100 lb, respectively. As stated previously, the relative amount of coke must be increased where a considerable amount of steel is in the charge. Even where the coke and iron charges are ideally proportioned, the cupola will not melt satisfactorily unless the proper amount of air is supplied constantly to promote maximum combustion. A highly skilled melter may make a fair guess, but the ordinary foundryman needs something more reliable. Fortunately, volume and pressure gages are available. More fortunately, blowers now are available which automatically control the volume and pressure of the blast to meet fluctuating conditions.

How To Melt Aluminum Chips

Q.—We occasionally pour light aluminum castings by melting aluminum scrap, but have had no success with aluminum chips from lathe turnings. Can you advise a procedure for handling the lathe turnings?

A.—In our opinion you will be farther ahead by selling the aluminum turnings and chips to a smelter who has facilities for and experience in handling such material. Usually chips and turnings are contaminated with oil, steel chips, and other debris, and for successful recovery they should be clean—removing as much of the oil as possible by centrifuging, and the steel by magnetic separation.

Metal recovery in a crucible is a slow tedious job. Procedure is to melt sufficient heavy material to form a molten heel 4 or 5 inches deep, preferably covering with a flux composed of 45 per cent potassium chloride and 55 per cent sodium chloride, or a suitable proprietary "cleaning" flux. Then small amounts of the chips and turnings are added to the molten heel, pushing and holding them below the surface until they dissolve. That procedure should be followed at intervals which permit the bath to remain in a liquid state. If too much cold material is added, the bath may freeze or become too pasty, and time must be allowed to bring it back to the liquid state. Cycle of adding material and bringing up to temperature is repeated until the pot is full of molten metal. Flux is skimmed off and then the metal degassed with dry nitrogen, chlorine or one of the proprietary salt fluxes available.

One procedure you might try for introducing the chips into the bath is to employ a cast iron or refractory tube about 3 or 4 inches in diameter at lower end and enlarged at the other to form a funnel. Lower end dips into the bath and a suitable plunger somewhat smaller than the tube diameter can be used to force the chips into the molten bath. In the case of an iron funnel, the section entering the molten bath should be well coated with whiting or clay or similar materials employed for coating iron melting pots for aluminum. Several thin coats with drying in between are better than one heavy coat.

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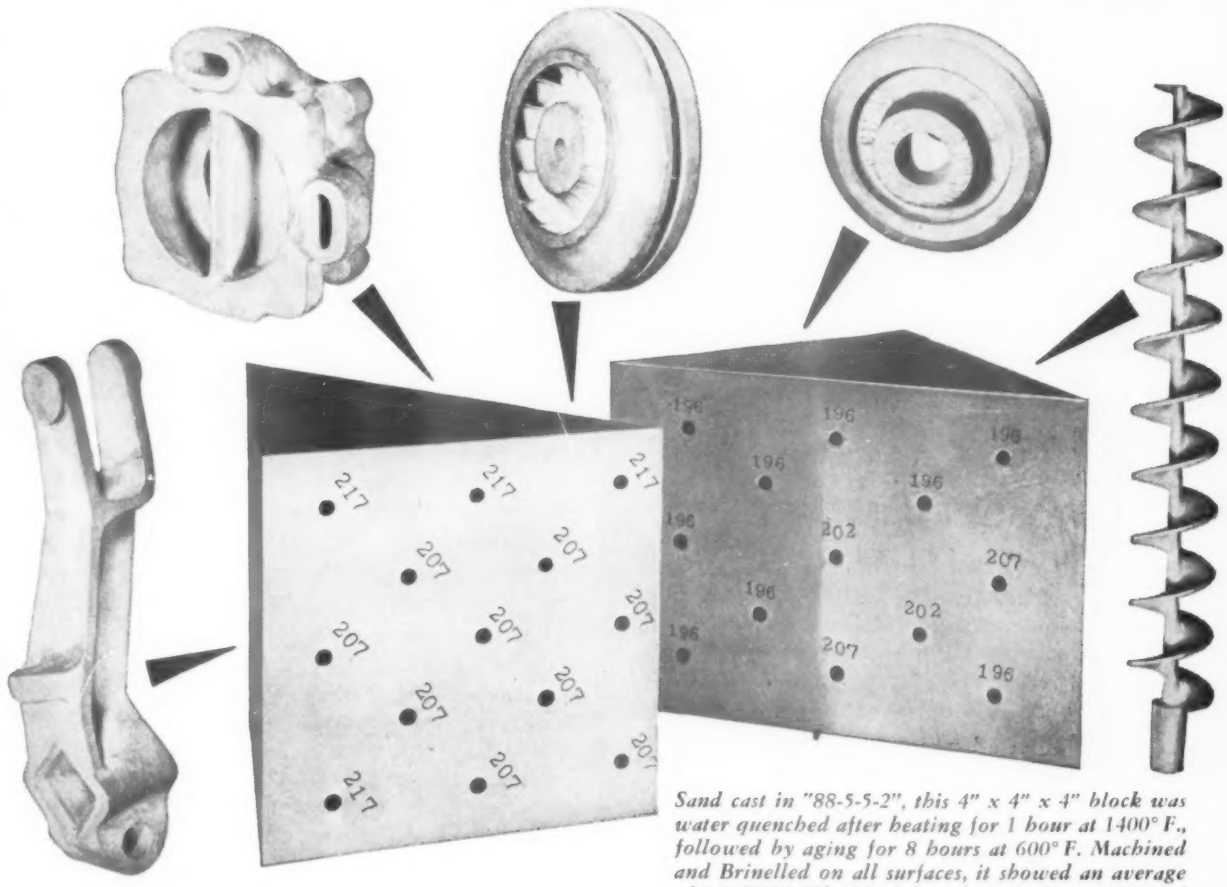

Sand cast in "88-5-5-2", this 4" x 4" x 4" block was water quenched after heating for 1 hour at 1400° F., followed by aging for 8 hours at 600° F. Machined and Brinelled on all surfaces, it showed an average of 209 BHN. The block was then cut diagonally, and both interior surfaces averaged 197 BHN.

Specify "88-5-5-2" (Copper-Tin-Nickel-Zinc) where you want corrosion-resistant bronze castings with extremely high mechanical properties.

This alloy in the "as-cast" condition serves the same purposes as "G" Bronze, but that's not the whole story.

The excellent physical properties of "88-5-5-2" may be immensely improved by heat treating . . . as exemplified by the block shown above.

The Nickel content provides the age-hardening response which increases both tensile and compressive strength, being particularly effective in raising the elastic properties. Nickel also increases fluidity in the casting mixture, thus affording a widened casting range that helps to minimize misruns and improves density and pressure-tightness.

This age-hardening Nickel-bronze meets wide demands. Philadelphia Bronze and Brass Corp., maker of the parts illustrated, produces "88-5-5-2" castings that range in size from ½" x 12" bars to parts weighing over 500 pounds.

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THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

YOUNG MEN for the FOUNDRY INDUSTRY

By FREDERICK G. SEFING
International Nickel Co., New York
Chairman
Educational Division, AFA

THE ancient axiom that, "The Lord helps those who help themselves," also holds in the case of foundries bringing young men into the industry. For years many industries have met their demands for young men by recruiting them from high schools, trade schools and engineering colleges. The methods used are simple, direct and successful because these companies have studied and use the proper approach to the schools and their students.

The foundry industry needs new blood to be trained for the future responsibilities of production, sales and development. This is no different from the problem of other great industries, and it suggests that foundries shall have to compete with other industries for young men. A good selling job and some well planned action on the part of foundry executives is therefore necessary.

The Educational Division of the American Foundryman's Association has studied the youth recruiting methods of industry and has prepared suggestions to foundry executives which have been effective with many companies. These suggestions, furthermore, are simple and direct and, if properly handled, will bring prompt results.

The five-point plan proposed is as follows:

1. A company should select the school which can best supply the type of men needed: High school, trade school or engineering college.

2. Contact the trade or high school principal or dean of engineering of the college, and the company's personnel problems should be explained to the interested faculty members. This discussion, it is recommended, should be followed by an invitation to the faculty to visit the foundry. This visit is to give to the faculty a clear understanding of the foundry operation and the type of jobs offered.

3. Student plant tours should be planned after the faculty thoroughly understands the work for which the young men are to be hired. Arrangements for the tours should be made through the faculty. These tours should be designed primarily to put on a show to excite interest for the foundry in the young man and gain his confidence in the company. Care should be taken to have the best possible guides for the students to explain what is going on and to answer questions. These tours are the foundry's sales appeal and, therefore, if properly done will do much toward interesting young men in the foundry as a career.

4. Personal interviews with those students who might be interested in foundry work should also be arranged through the school faculty. In arranging these interviews, the faculty can give excellent aid to the company representative by selecting good students for the interviews, with pointers on prevailing pay levels offered by other companies and explaining other inducements which are attractive to young men.

Students are preparing to finish school this coming June, and so the timing of these activities is important. The interviews should be planned soon after the plant tours and as early as possible before graduation from school. Since other industries are competing for the service of these men, a delay of interviews until late in the senior school year permits the competing industry to get the first chance to offer jobs to the best young men. Generally, then the poorer students are left without employment at graduation time.

Here, too, that company wins the best man who gets there first with the most inducements.

5. Good young men soon become an asset to an industry, and their value increases with the amount of good training they receive. This training is most efficient and effective if carried on by the company in an organized fashion. Only a few people have the ability to teach themselves, and even the best ones are prepared for industry in a shorter time by following an orderly training program. Post-school programs for semiskilled workers, apprentices and engineering graduates have been prepared by the Educational Division of the AFA and are available on request.

The investment by a company in a proper training program for young men is an asset, not only in improved plant efficiency, but also in good personnel relations and loyalty to the company. The reputation of a company regarding its handling of young men is the measure by which other boys will decide to work for that company.

If the foundries need young men, they can be had by some action on the part of the individual companies. The action is simple and direct and has proved successful in those plants where it has been used. No literature, talk or promotion by groups can be effective compared with a company contacting a student directly with a view to hiring his services. The manpower needs of the foundry industry can be met by such action, since it has a good future to offer young men.

The Educational Division and the local AFA chapter officers are prepared to help foundry management carry out this program to get their share of the nation's best young men. It is suggested that immediate contact be made with the local AFA Chapter to organize this program promptly.

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MEN of Industry

R. H. Frank, chairman of the Central Ohio Chapter of the American Foundrymen's Association for 1947-48, is chief metallurgist, Bonney-Floyd Co., Columbus, O. Mr. Frank was graduated from Ohio State University and joined Bonney Floyd Co. in 1920 as third helper on the open hearth. He subsequently became first helper, melter, chemical and metallurgical laboratory technician, and superintendent of heat treating. An active member of the AFA, he has served as a member of its Committee on Nondestructive Testing and as vice chairman of the Central Ohio Chapter last year. He also has been prominent on committees in American Society for Testing Materials, American Institute of Mining and Metallurgical Engineers, American Society for Metals, and is a member of the Industrial Radium and X-ray Society.

♦ ♦ ♦

John A. Fellows has been appointed assistant chief metallurgist at the Mahwah, N. J., research center, American Brake Shoe Co., New York. Dr. Fellows attended Williams College and was graduated from Massachusetts Institute of Technology in 1942. He joined American Brake Shoe Co. in 1937 as assistant metallurgist. He has resumed his association with the firm following 2½ years of service in the atomic energy field and 1½ years with Union Carbide & Carbon Corp., New York.

♦ ♦ ♦

E. C. Jeter, formerly assistant superintendent in charge of melting and hot metal, Ford Motor Co., Dearborn, Mich., has been appointed assistant to the manager of foundries. Mr. Jeter was graduated from Clemson College and became associated with the company in 1928, in the analytical laboratory of the metallurgical control department. The following year he was transferred to the experimental development department where he specialized in casting processes and techniques. He returned to the metallurgical control department in 1944 and in 1946 became assistant superintendent of the production foundry. **Raymond Powers** succeeds Mr. Jeter as assistant superintendent in charge of melting and hot metal. **William Goudey** continues as assistant superintendent in charge of cylinder block line.

♦ ♦ ♦

Walter W. Trout has been elected president of the Lufkin Foundry & Machine Co., Lufkin, Tex., succeeding his father, the late W. C. Trout, Mr. Trout is a graduate of Purdue University and attended Rice Institute and University of Texas. He joined the company as a machinist in 1925, and until his recent appointment had been vice president and general manager. **W. D. Winston Jr.,** who has been with the company for 34 years, has been elected to fill the vacancy left by the late Mr. Trout on the board of directors. Vice presidents of the company are **J. H. Kurth Jr.,** Houston; **E. P. Trout,** Lufkin; **A. E. Cudlipp,** Lufkin; and **L. A. Little,** Dallas.

♦ ♦ ♦

Grover M. Hoff, since 1929 superintendent of the Foundry Division, Pittsburg, Calif., plant of Columbia Steel Co., has retired. Mr. Hoff joined the Pittsburg plant of Columbia Steel in 1918. After serving his molder apprenticeship, he worked in various steel-producing centers and became skilled in iron, steel, brass and aluminum molding work. Well known in foundry circles, he contributed to improvements in foundry operating techniques and was consultant and advisor to other foundrymen. During the recent war he assisted in designing the Defense Foundry built at Pittsburg for the government.

♦ ♦ ♦

George F. Burditt has been appointed sales engineer, and with **John N. Harper,** will represent American Wheelabrator & Equipment Corp., Mishawaka, Ind., in the Pittsburgh territory. Mr. Burditt, a graduate of Kansas State College, was associated formerly with Gustin Bacon Co., Kansas City, as a development engineer. Priod to that he was a civil engineer with U. S. Soil Conservation Service.

♦ ♦ ♦

Hugo E. Johnson, for the last 7 years associated with the Research and Development Division, Carnegie-Illinois Steel Corp., Pittsburgh, has been appointed to the administrative staff of Battelle Memorial Institute, Columbus, O. A graduate of Ohio State University, Mr. Johnson also studied at University of Pittsburgh.

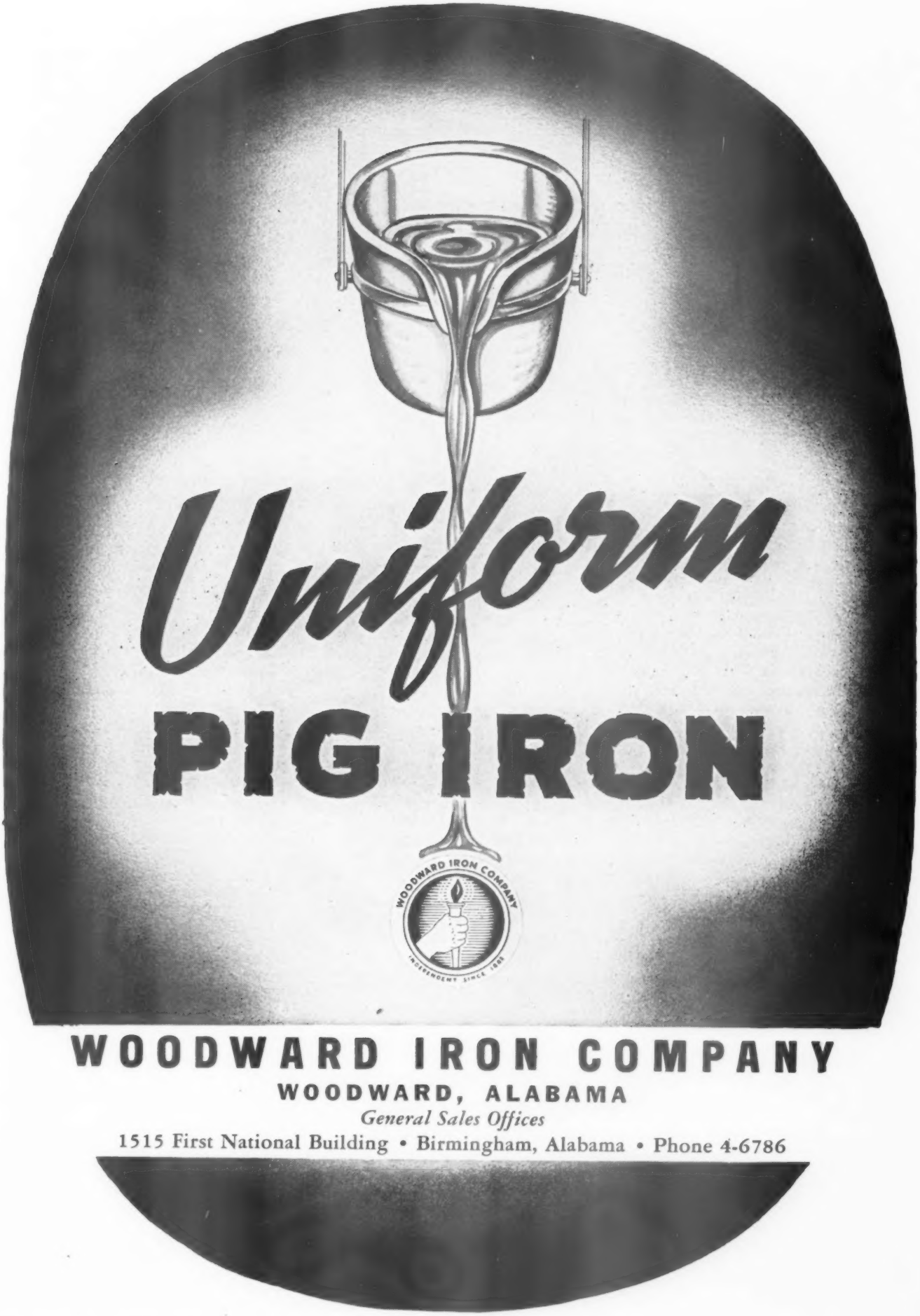
(*Continued on page* 104)

R. H. FRANK

JOHN A. FELLOWS

E. C. JETER

WALTER W. TROUT



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(*Continued from page* 102)

In his new position he will co-ordinate the interests of various research groups at Battelle and act in a liaison capacity between the institute and the iron and steel industries. Previous connections include Youngstown Sheet & Tube Co., Youngstown, O., and Battelle Institute where he was formerly engaged as an engineer in metallurgical research.

♦ ♦ ♦

R. L. Lefevre, for the last 10 years manager of the Washington branch sales office, General Electric X-Ray Corp., Milwaukee, has been made head of the sales department, directing activities of its local and district offices in United States and Canada. **W. D. Crelley** has been put in charge of the new merchandising department. Mr. Crelley has been manager of the advertising and sales promotion department for 3 years. **G. W. Happe** has been named manager of the newly-created products department comprising medical x-ray, industrial x-ray, dental x-ray, electromedical and supplies. Mr. Happe, formerly assistant to the vice president in charge of sales, has been associated with the company for 32 years. **L. L. Ludwigsen,** who has been associated with the company for 18 years, and has been manager of the merchandise supplies department, has been named to head the new services department, directing engineering and commercial services.

♦ ♦ ♦

Arch J. Cooper has been appointed regional manager of the new Empire district, Allis-Chalmers, Milwaukee, recently established to include New York, Buffalo, Rochester and Syracuse, N. Y., and Newark, N. J. A graduate of Sydney (Australia) Technical College, Mr. Cooper joined the company in 1909, and was associated with the Boston office prior to going to New York where he became district manager in 1945. He will continue in this capacity in addition to his new regional duties. **Vernon L. Spinney**, formerly New York petroleum sales representative, has been appointed assistant district office manager in the New York office. Mr. Spinney was graduated from Pratt Institute and joined Allis-Chalmers in 1930. **William J. Devers**, formerly public utilities sales representative, New York district office, has been named Newark district office manager. **Ned W. Landis,** branch manager of the Syracuse office has been made a district manager. **H. E. Weiss** and **Robert G. Burns** continue as district manager of the Buffalo office and as special representative of the Rochester office, respectively.

♦ ♦ ♦

George E. Richardson has been appointed assistant to the manager of the Feeder Division, Westinghouse Electric Corp., Pittsburgh, which supplies castings, screw machine details, electroplated parts, etc., to various operating divisions. Mr. Richardson was graduated from Kansas State College and joined the graduate student course at Westinghouse in 1930. He later was assigned to cost accounting work in the Motor Division and in 1932 was transferred to factory service accounting. He became division auditor in the Transportation and Feeder Divisions, and later assistant superintendent and budget administrator of the latter division. Among other duties Mr. Richardson will have direct responsibility for the division's budget administration, in his new appointment.

♦ ♦ ♦

John Bolton has resigned as assistant secretary of the Institute of British Foundrymen, to join the Institute of Cost and Works Accountants. Mr. Bolton, who joined the institute in 1938, was previously on the editorial staff of the *Foundry Trade Journal.* Active in reorganization of the IBF technical committee, he has been responsible for the *Journal* of the institute, whose publication commenced a year ago. **G. Lambert,** who succeeds Mr. Bolton as assistant secretary, was formerly chief assistant to the secretary of the Institute of Marine Engineers. Prior to that he had industrial experience on the north east British coast.

♦ ♦ ♦

F. K. McCune has been appointed assistant to the general manager of the apparatus department, General Electric, Schenectady, N. Y. Mr. McCune joined the company as a student engineer on its test course in 1928, following graduation from University of California. Later he entered the commercial department of International General Electric and in 1931 was transferred to the West Lynn, (Mass.) works, where he became assistant works engineer in 1945. In 1946 he returned to Schenectady as a member of the apparatus design engineering staff. He recently completed the advanced management course at Harvard University. In his new position he will assist the general manager on administration and organization matters.

♦ ♦ ♦

Julian W. Feiss, editor of the American Mining Congress *Journal,* has been appointed mineral consultant and assistant to the director of the Bureau of Mines. Mr. Feiss was graduated from Princeton University and received his master's degree in science from the Arizona School of Mines. In 1929 he went to Northern Rhodesia, Africa, as field geologist and mining engineer for the Rhodesian Congo Boarder Concessions Ltd., and during World War II was located there with

(*Continued on page* 108)

R. L. LEFEVRE

L. L. LUDWIGSEN

W. D. CRELLEY

G. W. HAPPE

Daniel Boone, Kentucky Frontiersman, escaping by throwing powdered tobacco into Indians' eyes.

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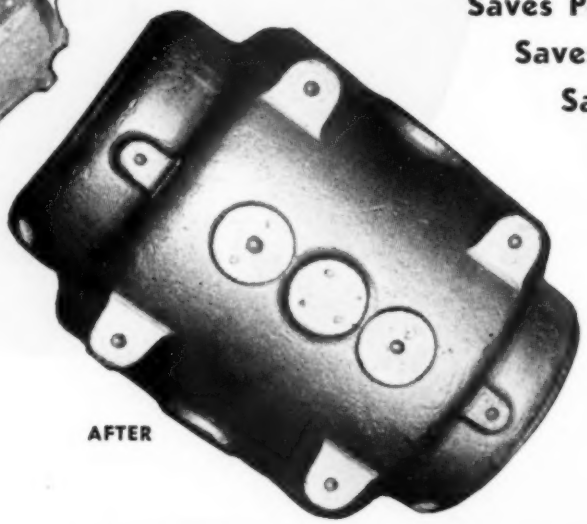

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Saves Labor
Saves Space
Saves Tools and Machining Time

The before and after views above illustrate the thoroughness of the Airless Wheelabrator method of blast cleaning.

At Right: The 36" x 42" Wheelabrator Tumblast (11½ cu. ft. capacity) installed at Golden's Foundry Company cleans loads of castings weighing from 600 to 1000 pounds in 6 minutes.

The pictures on the opposite page show representative parts that are quickly and thoroughly cleaned by Wheelabrating.

ALL the natural brilliance and lustre of virgin metal is strikingly brought to light by the fast, thorough-cleaning barrage of abrasive thrown by the Airless Wheelabrator. It imparts a new cleanliness to metal parts that results in savings all along the line . . . easier inspection . . . faster machining and grinding . . . longer tool life . . . a better bond between the metal and final finishes.

Of equal importance to manufacturers of Power Transmission Machinery is the high-speed, low-cost cleaning of the Wheelabrator. For example:

A 48" x 48" Wheelabrator Tumblast (20 cu. ft. capacity) installed at Dodge Manufacturing Company, builders of power transmission equipment, eliminated nine tumbling mills, a number of laborers were shifted to other work, and the extra space made available was utilized for a grinding and finishing room. A typical load of 52 cast sheaves each weighing about 50 pounds is cleaned by the Wheelabrator in 8 to 10 minutes. The same quantity of work formerly took several hours in the tumbling mills.

A 6' Wheelabrator Plain Table is used by Pontiac Foundry & Machine Co., for cleaning manganese bronze gear blanks. The work that formerly required all day and part of the second shift to clean in tumbling barrels is now Wheelabrated in 3½ hours.

The many advantages of the Airless Wheelabrator method of blast cleaning and case studies of its application in cleaning a wide variety of power transmission parts are described in our new booklet: "Cleaning Problems Solved . . . in the Manufacture of Power Transmission Machinery". Write for your free copy today.

TYPICAL USERS

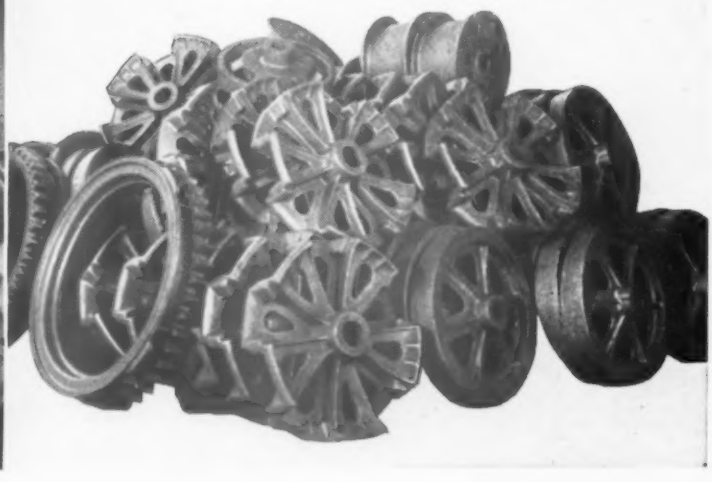
Dodge Mfg. Corp. . . . *Mishawaka, Ind.*
Link Belt Co. . . . . *Several places*
Chain Belt Co. . . . . *Milwaukee, Wisc.*
Continental Gin Co. *Birmingham, Ala.*
Brad Foote Gear Wks. . . . . *Cicero, Ill.*
The Medart Co. . . . . *St. Louis, Mo.*
Worthington Pump & Machinery Corp. . . . *Harrison, N. J.*
Jeffrey Mfg. Co. . . . . *Columbus, Ohio*
Std. Pressed Steel Co. *Jenkintown, Pa.*
Allis-Chalmers . . . . . *Milwaukee, Wisc.*
Westinghouse . . . . . *Several places*
The Reliance Electric & Engineering Co. *Cleveland, Ohio*
Diamond Iron Wks. *Minneapolis, Minn.*
Diamond Chain & Mfg. *Indianapolis, Ind.*
Lufkin Foundry & Machine *Lufkin, Texas*
Lindahl Fdry. Div. Amer. Gear & Mfg. . . . . *Chicago, Ill.*
Robert Holmes & Bros., Inc. *Danville, Ill.*
West Point Foundry & Machine Co. . . . . *West Point, Ga.*
McNally Pittsburg Mfg. Co. . . . . *Pittsburg, Kansas*
Sprout, Waldron & Co. . . . . *Muncy, Pa.*
Western Foundry Co. . . . . *Chicago, Ill.*
Union Iron Works . . . *Moline, Ill.*
The Jaeger Machine Co. *Columbus, Ohio*

TRANSMISSION PARTS BEING WHEELABRATED

Chain
Sprockets
Bearings
Couplings
Pulleys
Collars
Hangers
Reducers
Bushings
Base Plates
Clutches
Idlers
Traction Wheels
Drums
Take-ups
Pillow Blocks

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

American
WHEELABRATOR & EQUIPMENT CORP.
(FORMERLY AMERICAN FOUNDRY EQUIPMENT CO.)
505 S. Byrkit St., Mishawaka 2, Indiana



(*Continued from page* 104)

Army Military Intelligence Service. In 1931 he joined the Cleveland firm of Crowell & Murray Inc., as consulting mining engineer, and was associated with Climax Molybdenum Co., at Climax, Colo., for 5 years in various engineering capacities. Following service in the recent war he became editor of the American Mining Congress *Journal*.

♦ ♦ ♦

James P. Tate has been appointed Brazilian sales agent and service engineer, Herman Pneumatic Machine Co., Pittsburgh, with headquarters in Sao Paulo, Brazil. Mr. Tate attended Wayne University, Detroit, and since 1944 has been associated with Giffels & Vallet, Detroit industrial engineers. For the last 2 years he has been in charge of purchasing equipment, supplies and machinery for the Brazilian Railroad Equipment Co., and Brazilian National Steel Co. He is also president and founder of the Detroit Export Corp.

♦ ♦ ♦

Walter E. Remmers has been elected president, Electro Metallurgical Co., a unit of Union Carbide & Carbon Corp., New York. Mr. Remmers also was elected president of Electro Metallurgical Co. of Canada Ltd., and other associated metallurgical units of Union Carbide & Carbon Corp. A graduate of the Missouri School of Mines and Metallurgy, he later took postgraduate work in metallurgy at University of Michigan. He has been associated with various metallurgical units of the parent company since 1936, and has been vice president and a director of Electro Metallurgical Co. since 1945.

♦ ♦ ♦

Dr. G. V. Slottman, formerly manager of the technical sales division, Air Reduction New York, has been appointed technical assistant to the vice president. Dr. Slottman, who was graduated from Massachusetts Institute of Technology and University of Berlin, is a former professor of chemical engineering at M.I.T. He has been closely associated for 12 years with Air Reduction's development and introduction of steelmaking processes using large quantity, low-purity oxygen. **Scott D. Baumer,** formerly assistant manager, Technical Sales Division, succeeds Dr. Slottman as manager, and **Edward H. Roper** has been appointed assistant manager. Mr. Baumer, educated at Princeton University and University of Pittsburgh, spent several years in gray iron and steel foundry production and 14 years with Bethlehem Steel in production and maintenance work prior to joining Air Reduction in 1941. Mr. Roper, a graduate of Sheffield Scientific School, Yale University, joined the company in 1936. He served in the applied engineering department and metropolitan sales district, and was made assistant to the manager of the technical sales division in 1946.

♦ ♦ ♦

Ben H. Sachs Jr. has joined Helburn Engineering, Cincinnati representative for American Air Filter Co. Inc., Louisville. Mr. Sachs has been with the latter company since 1946 and will represent the air filter, dust control, engine and compressor divisions. He was graduated from University of Louisville and, prior to joining American Air Filter Co., served 3 years with the Navy as engineer and repair officer.

♦ ♦ ♦

Dr. Robert J. Anderson has resumed practice as a consulting engineer, specializing in the metallurgy of aluminum and magnesium. Dr. Anderson has had a wide experience in the light metals industry and was awarded the W. H. MacFadden gold medal of the American Foundrymen's Association in 1925, for scientific work in connection with the aluminum casting industry. He was educated at Case Institute of Technology and Massachusetts Institute of Technology. He may be reached at 125 North Portage Path, Akron 3, O., temporary headquarters.

♦ ♦ ♦

Dr. J. C. Warner has been appointed assistant director of the College of Engineering and Science, Carnegie Institute of Technology, where he will continue as head of the Chemistry Department and of Graduate Studies. A graduate of University of Indiana, where he received masters and doctors degrees, Dr. Warner is well known in the field of chemical research. In 1945 he received the Pittsburgh award of the American Chemical Society for outstanding service to chemistry. During the recent war he served as an assistant to **Dr. Charles A. Thomas,** vice president of Monsanto Chemical Co., St. Louis, when he directed and co-ordinated research in the laboratories of University of California, University of Chicago, Iowa State, M.I.T., and at the atomic bomb project at Los Alamos, N. Mex.

♦ ♦ ♦

Charles B. Proudfoot, until recently assistant director of the engineering and physics division, Fredric Flader Inc., North Tonawanda, N. Y., has been appointed senior research engineer in physics of the Research and Development Laboratory, the Carborundum Co., Niagara Falls, N. Y., where he will have charge of development of new and improved processes and products. Mr. Proudfoot was graduated from University of Michigan and spent 2 years as physicist and electrical engineer in the development and engineering department

(*Continued on page* 110)

JAMES P. TATE

WALTER E. REMMERS

DR. G. V. SLOTTMAN

DoALL BANDSAWS

13 Models

of high-speed bandsaws. DoALL—the world's bandsaw headquarters—is in constant touch with all industries; provides engineering assistance on "sawability" of materials to cut production costs. Write about your problem.

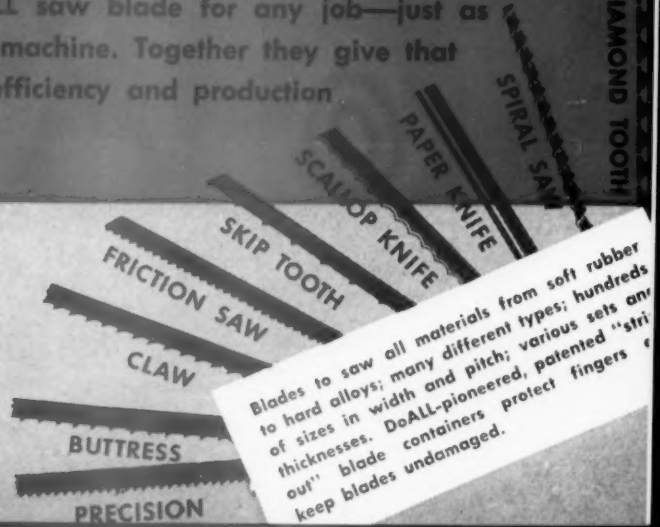
ZI-F-48

for Any Sawing Job!

ALL CASTINGS are sawed better, faster and at less cost with DoALL bandsaws—latest engineering achievements in sawing progress; time-tested by modern industry; do jobs previously considered impossible.

Many different models and sizes for shops large or small, priced to suit any budget. Besides, a DoALL bandsaw is "tailored" to exact requirements—the right cutting speed, set or variable; the right throat clearance and work-height capacity; the right accessories.

Also, there's a DoALL saw blade for any job—just as important as the right machine. Together they give that "teamwork" for high efficiency and production economy.


DIAMOND TOOTH
SPIRAL SAW
PAPER KNIFE
SCALLOP KNIFE
SKIP TOOTH
FRICTION SAW
CLAW
BUTTRESS
PRECISION
Blades to saw all materials from soft rubber to hard alloys; many different types; hundreds of sizes in width and pitch; various sets and thicknesses. DoALL-pioneered, patented "stri
out" blade containers protect fingers
keep blades undamaged.

The DoALL Company
Reg. U. S. Pat. Off.

REPRESENTATIVES IN 56 COUNTRIES

DoALL STORES IN KEY CITIES

Des Plaines, Illinois

Cable Address: DoALL, Des Plaines

(*Continued from page* 108)

of Cutler-Hammer Inc., Milwaukee. From 1939-1944 he was sales engineer in the Milwaukee district office, Spaulding Fibre Co. Inc., Tonawanda, N. Y. During the recent war he served as nuclear physicist with the Manhattan Project at Oak Ridge, Tenn., while commissioned as lieutenant (jg) in the Navy.

♦ ♦ ♦

H. Merrill Bowman has been appointed assistant divisional sales manager for power transmission equipment, Link-Belt Co., Chicago, with headquarters at the Pershing Road plant there. **Eugene S. Bogart** succeeds Mr. Bowman as district sales manager in Baltimore. Mr. Bowman attended Drexel Institute of Technology and was graduated from Temple University. He entered the Philadelphia plant in 1932, where he served in the engineering, sales and order departments. He was transferred to Baltimore in 1940 as district sales engineer and became district sales manager in 1945. Mr. Bogart joined the engineering department of the positive drive division at Philadelphia in 1926, studying mechanical engineering in evening classes at Drexel Institute of Technology for 3½ years. In 1936 he was transferred to positive drive sales, was sent to the Boston office the following year, and to Pittsburgh in 1940, where he served the positive drive division and later became district sales engineer for materials handling and power transmission products in the western Pennsylvania and northern West Virginia territories.

♦ ♦ ♦

A. W. Johansen has been appointed assistant district advertising manager for THE FOUNDRY, in the Chicago area, where he will be associated with George A. Pope, western manager. Mr. Johansen was born and educated in Moline, Ill. From 1930-42 he was a sales representative of Cudahy Packing Co., Chicago, covering 15 southern states for its By-Products Division. For the last 5 years he has been a sales representative of Carpenter Steel Co., Reading, Pa., in its Chicago office.

♦ ♦ ♦

F. D. Weatherholt, since 1940 eastern resale manager at New York for Westinghouse Electric Corp., Pittsburgh, has been appointed assistant industrial sales manager with headquarters at East Pittsburgh. Mr. Weatherholt was graduated from University of Kentucky and joined Westinghouse in 1921 as a member of the graduate student course. Upon completion of the course he was assigned to small motor sales in East Springfield, Mass. In 1925 he was transferred to the Albany, N. Y., sales office and a year later was assigned to the New York office. From 1942-1945 he served as a lieutenant commander in the Navy.

♦ ♦ ♦

Leo Halpern, Federated Metals Division, American Smelting & Refining Co., New York, has been elected president of the Brass and Bronze Ingot Institute, Chicago, formerly Nonferrous Ingot Metal Institute. **Marvin M. Cohn,** L. A. Cohn & Bro. Inc., Chicago, has been elected vice president, and **Howard K. Chapman,** H. Kramer & Co., Chicago, treasurer of the institute.

♦ ♦ ♦

Howard S. Davies has been appointed Chicago district manager of the Conveyor Division, the Jeffrey Mfg. Co., Columbus, O. **H. C. Rockwell** succeeds Mr. Davies as district manager of the Baltimore office and **Paul M. Hendry** replaces Mr. Rockwell at Columbus. **William K. Myers,** formerly of the New York office, has been named to succeed the late B. L. Lewis as district manager of the Boston office. **H. A. Lee** of the St. Louis office has been named district manager there, replacing **F. L. Kolb,** who has been transferred to Chicago as district manager of the Mining Division. The following sales engineers have been transferred from the Columbus office to district offices as indicated: **Earl J. Woltz** to Harlan, Ky.; **J. R. Brisley** to Philadelphia; **Norman S. Bell Jr.** to New York; and **William T. Davis** to Houston, Tex. **J. W. St. John** has been transferred from Pittsburgh to the Cleveland office.

♦ ♦ ♦

Ralph N. Schaper has joined the Marion Malleable Iron Works, Marion, Ind. Mr. Schaper served an apprenticeship in wood patternmaking at Sivyer Steel Casting Co., Milwaukee, prior to attending University of Wisconsin. He then worked successively at Sivyer Steel Casting Co., Pelton Steel Casting Co., Smith Steel Casting Co., Milwaukee, Lebanon Steel Foundry Co., Lebanon, Pa., Fort Pitt Steel Casting Co., McKeesport, Pa., and for the last 2½ years had been associated with Westlectric Castings Inc., East Los Angeles, Calif.

♦ ♦ ♦

G. P. Oldham has been appointed eastern division sales manager, Permanente Products Co., Oakland, Calif., directing sales in New York, New England, eastern Pennsylvania, Maryland, Delaware, Virginia and New Jersey with headquarters in New York. Mr. Oldham, who attended Colgate University, was general manager of the New York Brass & Copper Co. Inc., New York, for 9 years before joining Permanente. **R. C. Maentz** continues as district manager for the New York district

(*Continued on page* 113)

EUGENE S. BOGART

H. MERRILL BOWMAN

A. W. JOHANSEN

THE present demand for castings should prompt foundry owners and managers to consider their foundry's production capacity and profit potential in the light of expected future demands. What changes would be necessary in your present facilities, procedures or methods to insure profitable operation at present, lower, or higher production rates?

Quality... NOT QUANTITY in FOUNDRY ENGINEERING

Whether the requirement is elimination of a single "bottle neck", reorganization of individual departments, installation of cost control, job evaluation, standards, incentives, a complete foundry modernization program, temporary operation or management, or the design of a complete new plant, the job can be successfully accomplished by Lester B. Knight and Associates. A complete survey of your operations by our experienced survey engineers will determine what is required, what it will cost, and how soon you can expect to recover the cost through operational savings.

In the Lester B. Knight & Associates organization there are thirty men, each with ten to twenty-five years of successful foundry management, production, engineering, or equipment experience in all types of foundries. Through their coordinated knowledge and experience Knight can be of inestimable service in analyzing your foundry operations and recommending steps to permit the ultimate objective—maximum production at minimum unit cost.

The Knight organization is large enough to handle the big jobs—small enough to be interested in the small jobs. Quality—not quantity—in Foundry Engineering, is our creed.

KNIGHT Service for Foundries:

- Foundry Engineering
- Architectural Planning
- Foundry Layout
- Foundry Modernization
- Foundry Management
- Industrial Engineering; Job Evaluation, Incentives
- Production and Cost Control

LESTER B. KNIGHT & ASSOCIATES INC.

· *Consulting* *Engineers* ·

600 W. JACKSON BLVD.
CHICAGO 6, ILLINOIS

30 CHURCH STREET
NEW YORK 7, NEW YORK

CONSULTING SERVICE
for Management · Sales · Production

ENGINEERING SERVICE
for Surveys · Modernization · Mechanization

PERFECT LINE UP of cope and drag with UNIVERSAL FLASK PINS and BUSHINGS

If you're having trouble with cope and drag line-up on your casting production line and are losing valuable time and metal as a result, *it will pay you to investigate* Universal Flask Pins and Bushings. Precision-made in various standard sizes and shapes, Universal Flask Pins and Bushings can be readily installed in flasks *to insure positive alignment* with minimum effort. Cope bushings are quickly guided to the drag pins over a tapered, loose-fitting closing pin which is easily removed after assembly. Round or elongated bushings and round pin design permits longitudinal expansion resulting from metal heat. *Hardened and ground for lasting accuracy and maximum wear resistance.* Write for folder.

UNIVERSAL ENGINEERING COMPANY • **FRANKENMUTH 4, MICHIGAN**

(*Continued from page* 110)

sales office. **Charles S. French,** formerly manager of the Cleveland district sales office, has been named manager of the Central sales division headquarters in Cleveland. **Charles S. Barnum** has been appointed manager of sales in the Detroit district sales office, under direction of Mr. French. Mr. Barnum has been in aluminum manufacturing and selling fields since 1936. **Wayne Lake** has been put in charge of the new Salt Lake City, Utah, branch sales office, under jurisdiction of **Jack Leslie,** Oakland district sales manager.

Frederick K. Vial Retires After Long Service

FREDERICK K. VIAL, vice president and a director of the Griffin Wheel Co., Chicago, retired Jan. 1, 1948 after a long life's work filled with many outstanding accomplishments.

He was born in Lyonsville, Cook

FREDERICK K. VIAL

county, Ill., Apr. 22, 1864, and was educated at the University of Illinois, graduating with degrees in both agriculture and natural history in 1886. In 1918 he was honored with a master's degree in civil engineering by the same university. Notwithstanding his academic education, he soon embarked on an engineering career which later expanded to include metallurgy, the science of combustion of fuel in the process of melting iron in cupolas and many other subjects.

Early in his career he became connected with railway service when in 1887 he was employed as rod man with the Atchison, Topeka & Santa Fe Railway. From 1889 to 1892 he was division engineer for the Chicago & Alton Railway. From 1895 to 1896 he served as chief engineer of the Ajax Forge Co., Chicago, and from 1897 to 1902 as principal assistant engineer of the Chicago & Western Indiana Railroad.

In 1902 he joined the Griffin Wheel Co., as mechanical engineer and in 1906 he became chief engineer, in charge of manufacturing operations, cupola mixtures, wheel design, plant construction, research work and many other responsibilities for all plants of the company. Later he was elected vice president and in 1917 he was made a director.

On the formation of the Association of Manufacturers of Chilled Car Wheels in 1908 Mr. Vial was selected as consulting engineer, and later as vice president, which positions he retained to retirement. For many years he served on various committees and was very active in constantly improving the design and manufacturing practices of chilled car wheels. He has written innumerable papers and special articles pertaining to every phase of car wheel manufacture, and many other subjects pertaining to railroad equipment.

In addition to these activities he also made most exhaustive studies of the combustion of fuel within a cupola for melting iron. In 1940 he was awarded the J. H. Whiting Gold Medal of the American Foundrymen's Association for his outstanding work in the development of cupola processes, especially as shown in the Griffin hot blast cupola. Various other trophies have been presented to him by technical and scientific societies in recognition of his outstanding work. He has also obtained patents on numerous improvements pertaining to the design of wheels, wheel manufacturing facilities and melting processes.

L. A. Hamilton has been appointed vice president in charge of the Seattle, Wash., district office of Air Reduction Pacific Co., the new subsidiary of Air Reduction Co. Inc., recently organized to take over West Coast business of Air Reduction Sales Co., New York. Other vice presidents appointed to take charge of western offices include: **E. W. MacCorkle Jr.,** Portland, Oreg.; **H. W. Saunders,** San Francisco; and **H. A. Hoth,** Los Angeles.

♦ ♦ ♦

Peter Groustra has been appointed district sales manager in charge of the recently established Grand Rapids, Mich., office of Link-Belt Co., Chicago. Mr. Groustra, who attended Armour Institute of Technology, joined the company in 1926 as a draftsman at the Pershing Rd. plant in Chicago, where he spent 16 years in the engineering and sales departments. He was transferred to the Detroit office in 1943, where he has been district sales engineer. **Herbert E. Wolf,** formerly at the Indianapolis plant, will assist Mr. Groustra at Grand Rapids.

♦ ♦ ♦

Frank C. Riecks has been appointed manager of foundries, Ford Motor Co., Dearborn, Mich. Mr. Riecks joined the company following graduation from University of Michigan, in 1916, as a draftsman on plans for the River Rouge plant. Following military service he became assistant superintendent of construction at the Rouge plant in 1921, and 4 years later was placed in charge of construction of the steel mill, soaking pits and open hearth. He went to Shanghai, China, in 1931, to investigate plant construction possibilities and upon his return was appointed assistant chief engineer at the Rouge

RECORD: Frank C. Riecks, (left) manager of foundries, Ford Motor Co., Dearborn, Mich., is congratulated by William Goudey, assistant superintendent in charge of the cylinder block line, as a new production record is made

plant. In 1937 he was sent to Japan to purchase a factory site, and the following year began construction of a plant at Poissy, France. He returned to the United States at the outbreak of World War II and continued as assitant chief engineer at the Rouge plant where he designed a steel foundry, aluminum cylinder head foundry, magnesium foundry and aluminum tank engine foundry. He was appointed technical director of the foundry motor group in 1945.

♦ ♦ ♦

Ralph H. Lundberg has been elected vice president, the Peninsular Grinding Wheel Co., Detroit. Mr. Lundberg has been associated with the engineering staff of Norton Co., Worcester, Mass., for the last 19 years.

♦ ♦ ♦

Henry J. Trenkamp, president of Ohio Foundry Co., Cleveland, a director and treasurer of Gray Iron Founders' Society, has been elected chairman of the recently organized Northern Ohio group of that organization. **James B. Heisler,** vice president, A. C. Williams Co., Ravenna, O., also a director of the society, has been elected vice chairman, and **F. J. Dost,** vice president, Sterling Foundry Co., Wellington, O., has been named secretary-treasurer.

♦ ♦ ♦

Calvert Carey, formerly a vice president, has been elected president, Yale & Towne Mfg. Co., New York, succeeding the late W. Gibson Carey Jr. **Fred Dunning** has been named executive vice president and will also act as secretary and treasurer.

♦ ♦ ♦

George A. Kelly has been appointed president of G. A. Kelly Plow Co., Longview, Tex., succeeding his father **R. M. Kelly,** now chairman of the board of directors.

♦ ♦ ♦

Walter M. Weil, president, founder and principal stockholder of the National Smelting Co., Cleveland, is retiring. The plant, laboratories and equipment of National have been acquired by Apex Smelting Co., Chicago.

♦ ♦ ♦

Walter M. Hoeffelman has been appointed manager, Moran Flexible Joint Co., Inc., Louisville, succeeding **Donald Rider.** Mr. Hoeffelman had been associated until recently with Henry Vogt Machine Co., Louisville.

♦ ♦ ♦

James W. Kritz is sole owner and general manager of the Michigan City Pattern Works, Michigan City, Ind., following withdrawal of his former partner, **H. W. Rasmussen,** from the business.

♦ ♦ ♦

E. H. Fowler has been made purchasing agent of Thomas & Skinner Steel Products Co., Indianapolis, succeeding **C. H. Wiles.**

♦ ♦ ♦

C. R. Howard has been made purchasing agent of Ertel Machine Co., Indianapolis, succeeding **W. L. Kelso.**

National Castings Council Formally Organized

NATIONAL Castings Council was formally organized at a meeting in Cleveland, Jan. 15, with the following founding members: American Foundrymen's Association, Foundry Equipment Manufacturers Association, Foundry Supply Manufacturers Association, Gray Iron Founders' Society, Malleable Founders' Society, National Founders Association, Non-Ferrous Founders' Society Inc., and Steel Founders' Society of America.

The council has been organized to provide a medium for co-operative action among its members on matters of mutual interest beyond the scope of the individual societies or in connection with problems which can be handled by co-operative action.

The council has elected the following officers: President, Howard A. Stockwell, secretary, Barbour Stockwell Co., Cambridge, Mass., and president, Gray Iron Founders' Society; vice president, Otto A. Pfaff, president, American Wheelabrator & Equipment Corp., Mishawaka, Ind., and president, Foundry Equipment Manufacturers Association; treasurer, F. Ray Fleig, Smith Facing & Suppy Co., Cleveland, and president, Foundry Supply Manufacturers Association; secretary, Frank G. Steinebach, editor, THE FOUNDRY, Cleveland.

The formal organizational meeting was devoted to a discussion of the organization of the council, and to further action in connection with bylaws of the organization. Representatives on the council also discussed problems connected with safety codes, the idea of establishing a clearing house for convention and meeting dates of organizations in the foundry industry; contact with the Munitions Board of the Military Establishment with regard to the organization of advisory committees for the foundry industry, and the development of programs for apprentice training. Discussion also included present difficulties with raw materials supply; the organization of the Office of Industry Co-operation by the Department of Commerce; and the report of the successful fund-raising campaign of the Foundry Educational Foundation. All council members were represented at the meeting.

OTTO A. PFAFF

HOWARD A. STOCKWELL

F. RAY FLEIG

FRANK G. STEINEBACH

THIS MONTH, 62,562* BUYERS OF CASTINGS WILL READ THIS AD...

This is one of a series of 6 full page ads emphasizing the expanding industrial acceptance of Brass Castings. Nationally circulated in outstanding trade journals and read by manufacturers, engineers, contractors, metallurgists, production control men—*these messages reach the men who specify and influence the purchasing of castings!*

R. Lavin & Sons, Inc.

PLUMBING ENGINEERS ADVOCATE...

Brass Castings for Corrosion Resisting Qualities!

FIVE THOUSAND YEARS of human experience is adequate testimony that Copper Alloys effectively resist the destructive forces of corrosion. Throughout the ages and especially today, Brass and Bronze Alloys coupled with skillful craftsmanship, consistently prove themselves best for plumbing installations. That is why . . .

PLUMBING ENGINEERS *ADVOCATE*
BRASS CASTINGS
FOR CORROSION RESISTING QUALITIES!

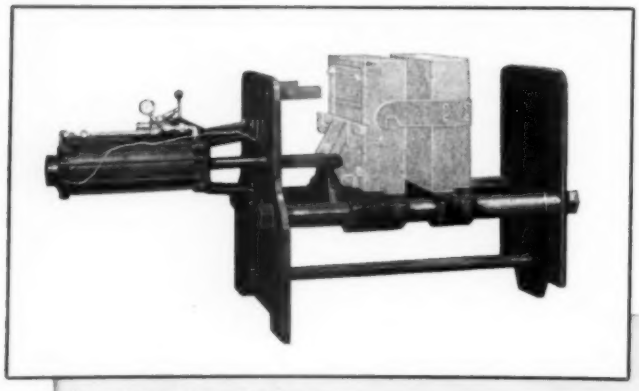
R. LAVIN & SONS, INC.
Refiners of Brass, Bronze and Aluminum
3426 SOUTH KEDZIE AVENUE · CHICAGO 23, ILLINOIS
REPRESENTATIVES IN PRINCIPAL CITIES

REPRINTS OF ENTIRE *Brass Castings* SERIES ARE YOURS FOR THE ASKING

The Foundryman's Problems . . . Are Our Problems!

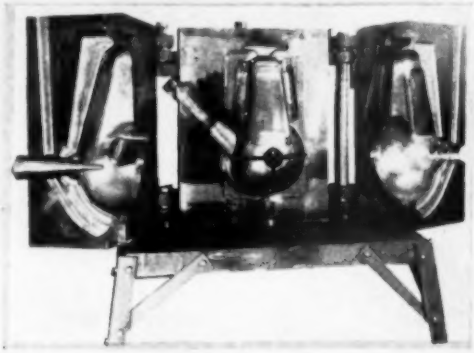
* Audited Circulation plus pass-on readership.

We specialize in PERMANENT MOLDS FOR ALUMINUM CASTINGS



This method of making aluminum castings is rapidly becoming more popular because it is based on three sound economic reasons. Aluminum castings produced in permanent molds are cleaner and better looking; they have a closer dimensional accuracy; they can be produced more economically.

For suitable production castings, pneumatic permanent mold equipment gives you even greater economy and also speeds production. The main advantage of this kind of mold equipment is that the interchangeable custom built mold blocks can be quickly and easily bolted to this air operated table. This interchangeable feature greatly reduces future mold costs. The table itself is durable and simple in design and can be used continuously.



For certain types of castings, depending on the production, size, and weight, the manually operated is most economical.

WOOD AND METAL PATTERNS

We are also well equipped to make all types of wood and metal patterns in accordance with the specifications of your foundry. Precision patterns and models are a specialty.

Your molds and pattern equipment, if properly constructed for the purpose they are to be used, can save you up to 25% on casting cost. On high production items this can amount to even greater savings.

Investigate now for greater savings later.

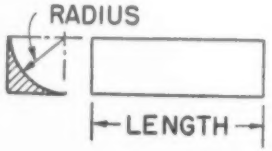
Send us your blueprints or sample castings for quotation.

MASTER PATTERN COMPANY

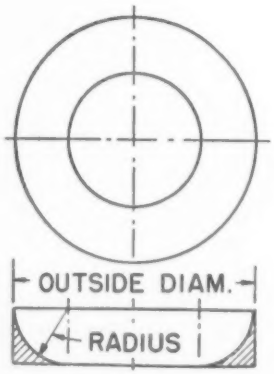
1315 MAIN AVENUE — CLEVELAND 13, OHIO

DESIGNERS AND MANUFACTURERS OF PERMANENT MOLDS, WOOD AND METAL PATTERNS AND MODELS

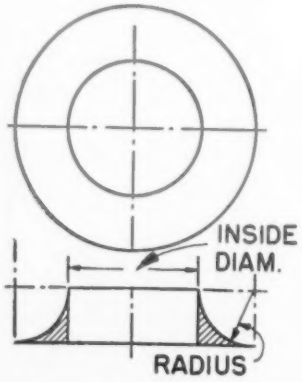
DETERMINING THE WEIGHTS OF METAL FILLETS



To find the weight in lb of a fillet of any length multiply the weight per inch, obtained from the accompanying table by the length.



To find the weight in lb of an inside circular fillet, first find the circumference of a circle whose diameter is the outside diameter minus 0.45 of the radius. Then the weight required is this circumference multiplied by the weight per inch obtained from the accompanying table.



To find the weight of an outside circular fillet, first find the circumference of a circle whose diameter is the inside diameter plus 0.45 of the radius. Then the weight required is this circumference multiplied by the weight per inch obtained from the accompanying table.

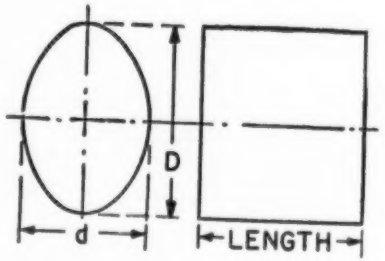
Weight of Fillet 1 Inch Long When Cast in:

Rad. in inches	Cast iron	Steel	Aluminum	Copper	Zinc	Gun metal	Yellow brass
¼	.0035	.0038	.0013	.0043	.0034	.0043	.0041
⅜	.0079	.0086	.0029	.0097	.0077	.0095	.0091
½	.0140	.0152	.0052	.0172	.0136	.0170	.0163
⅝	.0219	.0238	.0081	.0266	.0222	.0265	.0254
¾	.0315	.0342	.0116	.0386	.0307	.0381	.0367
⅞	.0440	.0466	.0158	.0526	.0416	.0520	.0498
1	.0559	.0612	.0207	.0688	.0543	.0679	.0652
1⅛	.0710	.0772	.0262	.0871	.0688	.0857	.0823
1¼	.0876	.0954	.0322	.107	.0850	.106	.102
1⅜	.106	.115	.0390	.130	.103	.128	.123
1½	.126	.137	.0465	.155	.122	.153	.147
1⅝	.148	.162	.0545	.181	.143	.179	.172
1¾	.174	.186	.0634	.211	.166	.208	.200
1⅞	.197	.214	.0726	.242	.191	.239	.229
2	.224	.244	.0826	.274	.217	.271	.260
2⅛	.253	.276	.0935	.310	.245	.304	.293
2¼	.285	.310	.105	.349	.274	.342	.328
2⅜	.325	.346	.117	.389	.307	.384	.367
2½	.351	.383	.126	.430	.340	.425	.405
2⅝	.386	.423	.142	.474	.376	.468	.449
2¾	.425	.464	.156	.520	.412	.512	.493
2⅞	.463	.505	.171	.568	.450	.558	.537
3	.504	.550	.186	.620	.488	.612	.586
3⅛	.548	.597	.202	.672	.531	.662	.635
3¼	.592	.645	.218	.726	.573	.715	.687
3⅜	.638	.694	.236	.784	.620	.772	.742
3½	.686	.747	.254	.841	.666	.830	.797
3⅝	.737	.800	.272	.905	.715	.890	.855
3¾	.789	.857	.289	.968	.765	.954	.915
3⅞	.841	.916	.312	1.03	.815	1.02	.977
4	.896	.978	.330	1.10	.868	1.08	1.04
4⅛	.944	1.04	.352	1.17	.922	1.15	1.11
4¼	1.01	1.10	.374	1.24	.980	1.22	1.17
4⅜	1.07	1.16	.396	1.31	1.04	1.30	1.25
4½	1.14	1.23	.418	1.39	1.10	1.37	1.32

Weight of Fillet 1 Inch Long When Cast in:

Rad. in inches	Cast iron	Steel	Aluminum	Copper	Zinc	Gun metal	Yellow brass
4⅝	1.20	1.30	.442	1.47	1.16	1.45	1.39
4¾	1.26	1.37	.467	1.55	1.23	1.53	1.47
4⅞	1.33	1.44	.492	1.63	1.29	1.61	1.55
5	1.40	1.52	.516	1.72	1.36	1.70	1.63
5⅛	1.47	1.60	.544	1.80	1.43	1.78	1.71
5¼	1.54	1.68	.568	1.89	1.50	1.87	1.79
5⅜	1.62	1.76	.598	1.98	1.57	1.96	1.88
5½	1.70	1.84	.626	2.08	1.64	2.05	1.97
5⅝	1.78	1.93	.643	2.17	1.72	2.14	2.06
5¾	1.86	2.02	.682	2.27	1.80	2.24	2.15
5⅞	1.94	2.11	.713	2.37	1.88	2.34	2.24
6	2.02	2.20	.742	2.47	1.96	2.44	2.34
6⅛	2.10	2.29	.773	2.58	2.04	2.54	2.44
6¼	2.19	2.38	.805	2.68	2.12	2.65	2.54
6⅜	2.28	2.47	.838	2.79	2.21	2.75	2.65
6½	2.37	2.57	.874	2.90	2.30	2.86	2.75
6⅝	2.46	2.67	.906	3.02	2.38	2.97	2.85
6¾	2.55	2.78	.942	3.13	2.47	3.08	2.96
6⅞	2.65	2.89	.975	3.25	2.56	3.20	3.07
7	2.75	2.99	1.01	3.37	2.66	3.32	3.18
7⅛	2.84	3.10	1.05	3.50	2.75	3.44	3.29
7¼	2.94	3.21	1.09	3.62	2.85	3.56	3.42
7⅜	3.04	3.32	1.12	3.74	2.96	3.68	3.54
7½	3.15	3.43	1.16	3.86	3.06	3.82	3.66
7⅝	3.26	3.54	1.20	3.99	3.16	3.94	3.78
7¾	3.37	3.66	1.24	4.12	3.26	4.07	3.91
7⅞	3.48	3.78	1.28	4.26	3.37	4.20	4.03
8	3.59	3.91	1.32	4.38	3.48	4.34	4.17
8⅛	3.70	4.03	1.36	4.53	3.59	4.48	4.30
8¼	3.82	4.16	1.41	4.68	3.70	4.62	4.43
8⅜	3.93	4.28	1.45	4.81	3.81	4.76	4.57
8½	4.05	4.40	1.50	4.95	3.92	4.90	4.71
8⅝	4.17	4.53	1.54	5.10	4.04	5.04	4.84
8¾	4.29	4.67	1.58	5.26	4.16	5.19	4.98
8⅞	4.42	4.81	1.63	5.42	4.28	5.34	5.12

TABLE OF WEIGHTS FOR ELLIPTICAL BARS



The accompanying tables give the weights in lb of elliptical bars of cast iron, steel, aluminum, copper, zinc, gun metal and yellow brass in one-inch lengths. To find the weight of an elliptical bar of these materials of any given length, multiply the weight per running inch from the table by the total length of the bar in inches.

Weight of Bar 1 Inch Long When Cast in:

d	D	Cast iron	Steel	Aluminum	Copper	Zinc	Gun metal	Yellow brass
¾	1	.153	.167	.057	.188	.149	.186	.178
¾	1¼	.192	.209	.071	.235	.186	.232	.223
¾	1½	.230	.251	.085	.283	.223	.279	.268
¾	1¾	.268	.292	.099	.330	.260	.325	312
¾	2	.307	.334	.113	.377	.297	.371	.357
¾	2¼	.345	.376	.128	.424	.335	.418	.401
¾	2½	.383	.418	.142	.471	.372	.464	.446
¾	2¾	.422	.460	.156	.518	.409	.511	.491
¾	3	.460	.501	.170	.565	.446	.557	.535
1	1¼	.256	.278	.095	.313	.248	.309	.297
1	1½	.307	.334	.114	.375	.297	.371	.356
1	1¾	.358	.389	.133	.438	.347	.433	.416
1	2	.409	.445	.152	.500	.397	.495	.475
1	2¼	.460	.501	.170	.564	.446	.557	.535
1	2½	.511	.556	.190	.625	.496	.619	.594
1	2¾	.562	.612	.209	.688	.545	.681	.653
1	3	.613	.667	.228	.750	.595	.743	.712
1	3½	.716	.779	.265	.875	.694	.866	.851
1	4	.818	.890	.303	1.00	.793	.990	.950
1¼	1½	.384	.418	.142	.471	.372	.464	.446
1¼	1¾	.448	.487	.166	.548	.434	.542	.519
1¼	2	.512	.556	.190	.625	.496	.619	.594
1¼	2¼	.576	.626	.212	.705	.558	.697	.668
1¼	2½	.640	.694	.236	.784	.620	.774	.742
1¼	2¾	.704	.764	.259	.862	.682	.851	.816
1¼	3	.768	.833	.283	.941	.744	.929	.890

Weight of Bar 1 Inch Long When Cast in:

d	D	Cast iron	Steel	Aluminum	Copper	Zinc	Gun metal	Yellow brass
1¼	3½	.896	.971	.331	1.10	.868	1.08	1.04
1¼	4	1.02	1.11	.378	1.25	.992	1.24	1.19
1¼	4½	1.15	1.25	.425	1.41	1.12	1.39	1.34
1¼	5	1.28	1.39	.473	1.57	1.24	1.55	1.48
1½	1¾	.537	.585	.198	.659	.520	.650	.624
1½	2	.613	.667	.227	.753	.595	.743	.713
1½	2¼	.690	.752	.255	.848	.669	.835	.803
1½	2½	.767	.835	.283	.942	.743	.928	.892
1½	2¾	.843	.919	.312	1.04	.818	1.02	.981
1½	3	.920	1.00	.340	1.13	.892	1.11	1.07
1½	3½	1.07	1.17	.397	1.32	1.04	1.30	1.25
1½	4	1.23	1.34	.453	1.51	1.19	1.49	1.43
1½	4½	1.38	1.50	.510	1.69	1.34	1.67	1.61
1½	5	1.53	1.67	.567	1.88	1.49	1.86	1.78
1½	5½	1.69	1.84	.624	2.07	1.63	2.04	1.96
1½	6	1.84	2.01	.681	2.26	1.78	2.23	2.14
2	2½	1.02	1.11	.378	1.25	.992	1.24	1.19
2	3	1.23	1.34	.455	1.51	1.19	1.49	1.43
2	3½	1.43	1.56	.530	1.76	1.39	1.73	1.66
2	4	1.64	1.78	.606	2.01	1.59	1.98	1.90
2	4½	1.84	2.01	.681	2.26	1.78	2.23	2.14
2	5	2.05	2.23	.758	2.51	1.98	2.48	2.38
2	5½	2.25	2.45	.833	2.76	2.18	2.72	2.61
2	6	2.46	2.67	.909	3.01	2.38	2.97	2.85
2	7	2.86	3.12	1.06	3.51	2.78	3.47	3.33
2	8	3.27	3.57	1.21	4.01	3.17	3.96	3.80

Weight of Bar 1 Inch Long When Cast in:

d	D	Cast iron	Steel	Aluminum	Copper	Zinc	Gun metal	Yellow brass
2½	3	1.53	1.67	.567	1.88	1.49	1.86	1.78
2½	3½	1.79	1.95	.662	2.19	1.74	2.17	2.08
2½	4	2.05	2.23	.756	2.51	1.98	2.48	2.38
2½	4½	2.30	2.50	.851	2.82	2.23	2.79	2.67
2½	5	2.56	2.78	.955	3.14	2.47	3.10	2.97
2½	5½	2.81	3.06	1.05	3.45	2.72	3.40	3.26
2½	6	3.06	3.34	1.14	3.77	2.97	3.71	3.56
2½	7	3.57	3.90	1.33	4.40	3.47	4.33	4.15
2½	8	4.08	4.45	1.52	5.02	3.97	4.95	4.75
2½	9	4.59	5.01	1.71	5.65	4.46	5.57	5.34
2½	10	5.11	5.56	1.89	6.27	4.96	6.19	5.94
3	3½	2.14	2.34	.797	2.63	2.08	2.60	2.49
3	4	2.46	2.67	.909	3.01	2.38	2.97	2.85
3	4½	2.76	3.01	1.02	3.39	2.68	3.34	3.21
3	5	3.06	3.34	1.13	3.76	2.98	3.71	3.56
3	5½	3.37	3.68	1.25	4.14	3.27	4.08	3.92
3	6	3.68	4.01	1.36	4.52	3.57	4.45	4.28
3	7	4.29	4.68	1.58	5.27	4.16	5.19	4.99
3	8	4.90	5.35	1.81	6.02	4.76	5.93	5.71
3	9	5.52	6.01	2.03	6.77	5.35	6.68	6.42
3	10	6.13	6.68	2.26	7.53	5.95	7.42	7.13
3	11	6.74	7.35	2.49	8.28	6.54	8.16	7.84
3	12	7.36	8.01	2.72	9.03	7.14	8.91	8.55
3½	4	2.86	3.12	1.06	3.51	2.78	3.47	3.33
3½	4½	3.22	3.51	1.19	3.95	3.13	3.91	3.74
3½	5	3.57	3.90	1.33	4.40	3.47	4.33	4.15
3½	5½	3.93	4.29	1.46	4.83	3.81	4.76	4.57
3½	6	4.29	4.69	1.58	5.27	4.16	5.19	4.99
3½	7	5.01	5.47	1.84	6.15	4.86	6.05	5.82
3½	8	5.72	6.24	2.11	7.02	5.55	6.92	6.66
3½	9	6.44	7.01	2.39	7.90	6.25	7.79	7.49
3½	10	7.15	7.78	2.65	8.79	6.94	8.67	8.32
3½	11	7.87	8.56	2.91	9.66	7.64	9.54	9.15
3½	12	8.58	9.34	3.17	10.53	8.33	10.40	9.97

Weight of Bar 1 Inch Long When Cast in:

d	D	Cast iron	Steel	Aluminum	Copper	Zinc	Gun metal	Yellow brass
4	4½	3.68	4.01	1.36	4.51	3.57	4.46	4.28
4	5	4.08	4.45	1.52	5.02	3.97	4.95	4.75
4	5½	4.49	4.90	1.67	5.52	4.36	5.44	5.23
4	6	4.90	5.35	1.81	6.02	4.76	5.93	5.71
4	7	5.72	6.24	2.11	7.02	5.55	6.92	6.66
4	8	6.54	7.13	2.42	8.03	6.35	7.92	7.61
4	9	7.36	8.01	2.72	9.03	7.14	8.91	8.55
4	10	8.17	8.89	3.02	10.03	7.94	9.91	9.50
4	11	8.99	9.78	3.33	11.04	8.73	10.90	10.45
4	12	9.81	10.68	3.63	12.04	9.52	11.89	11.40
4½	5	4.59	5.01	1.71	5.65	4.46	5.57	5.34
4½	5½	5.06	5.51	1.88	6.21	4.91	6.12	5.87
4½	6	5.52	6.01	2.05	6.77	5.35	6.68	6.42
4½	7	6.44	7.01	2.39	7.90	6.25	7.79	7.49
4½	8	7.36	8.01	2.72	9.03	7.14	8.91	8.55
4½	9	8.28	9.01	3.06	10.16	8.03	10.02	9.62
4½	10	9.19	10.01	3.40	11.29	8.93	11.14	10.69
4½	11	10.11	11.01	3.74	12.42	9.82	12.25	11.76
4½	12	11.04	12.02	4.08	13.54	10.71	13.37	12.82
5	6	6.13	6.67	2.27	7.53	5.95	7.43	7.13
5	7	7.15	7.78	2.65	8.79	6.94	8.67	8.32
5	8	8.17	8.89	3.02	10.03	7.94	9.91	9.51
5	9	9.19	10.01	3.40	11.29	8.93	11.14	10.69
5	10	10.22	11.12	3.78	12.54	9.92	12.38	11.88
5	11	11.24	12.23	4.16	13.79	10.91	13.62	13.07
5	12	12.27	13.35	4.54	15.05	11.90	14.86	14.25
6	7	8.58	9.34	3.17	10.53	8.33	10.40	9.97
6	8	9.81	10.68	3.63	12.04	9.52	11.89	11.40
6	9	11.04	12.02	4.08	13.54	10.71	13.37	12.82
6	10	12.27	13.35	4.54	15.05	11.90	14.86	14.25
6	11	13.49	14.69	5.00	16.56	13.09	16.34	15.67
6	12	14.72	16.02	5.45	18.07	14.28	17.83	17.10

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MAN-TO-MAN
on the Molder's Bench

By RALPH L. LEE

"In the Other Fellow's Shoes"

SEEMS like everything a person picks up to read nowdays has something in it telling business owners and bosses what they ought to do to get along with the people who work for them. It struck me the other day that I hardly ever see anything along the lines of how to go about getting along with the bosses. Yet in spite of working people's rights, collective bargaining and all that sort of thing, it usually turns out that when some individual does step out and start going places the chances are he did it with the encouragement and say-so of the bosses ahead of him.

As I go around the country visiting factory and foundry people I hardly ever get away from any one group without some ambitious fellow (either young or old) buttonholing me with, "Doc, I agree with you, but why in heck don't you start working on those cookies up in the front office?" Then they confide in me that, as far as they can see, the principal thing holding them back from doing what they know darned well they can do is a lack of understanding, interest and appreciation on the part of top management.

I gather from what these folks tell me that they must believe that if they could only get the ear of the big boss long enough to enlighten him as to what they are really up to, the crying need for what they are trying to do and the benefits which are bound to come from it, everything would be hunkeydorey for them. While no doubt some of them may have a point, I notice they hardly ever mention the other problems they were hired to solve and are free to work on but haven't gotten around to yet.

Whether they intend to or not, they leave the impression with me that they are so far ahead of schedule they now have time to educate the folks responsible for running the business.

Of course I don't think anyone would want to deny that it's a wonderful thing to be able to put yourself in the other fellow's shoes and that the more of this ability scattered around the place the better it would be for everyone. The only trouble is that most of the people suffering from FRONT OFFICE FRUSTRATION have never had the job of running a business themselves. About the only thing they have had in common with those who have is 24 hours a day to spend.

Without getting too fatherly or getting into an argument, I usually try to bend the subject around and away from the shortcomings of the front office to a line of talk like this—"How long did you say your outfit's been running under the present management? Twenty years? Gee! that's quite a spell, isn't it? Now, that new building going up over there—that's certainly going to be something. I imagine it was quite a problem trying to decide whether the business rolling in now will keep on rolling when the new building is up, furnished and paid for. Somebody around here must know the score or at least thinks he does—anyway I think they knew what they were doing when they picked you for the fine job I think you are doing."

Then I chuckle as I tell them about the time when I started a little business of my own and would have made a go of it too if I could've stood up under the strain. I recall how my job as manager struck me as being a dead ringer for that of an overworked fire chief without half enough equipment or men. I was always running around like a chicken with its head off putting out fires someone else started. I go on to say that every time I tried to sit down and do some constructive fire prevention planning the darned old gong would ring and away I'd have to dash again.

That's why, I tell 'em, I imagine these fire-chief managers of ours have to hire us to take hold of jobs that have got to be done while they are dashing about on the emergency calls that can't wait.

Anyhow, seeing to it that enough business is coming in to keep the outfit running, being sure that enough and the right kind of equipment, tools, materials, men and money are on the job and on *time*. Keeping out of trouble with the law, the unions, the banks and customers—to say nothing of keeping out of the red with enough money for the pay rolls—is *one real chore in anybody's language*. As far as I can see, only one out of a whale of a lot of people has what it takes and can stand the gaff without going nuts.

I imagine it's almost next to the

(*Concluded on page* 123)

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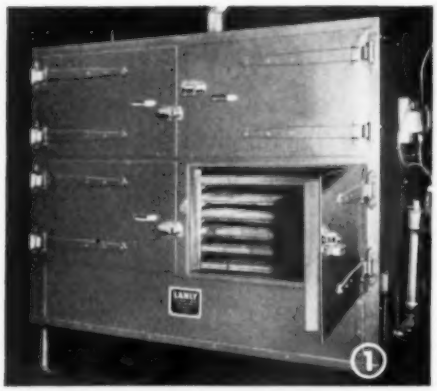
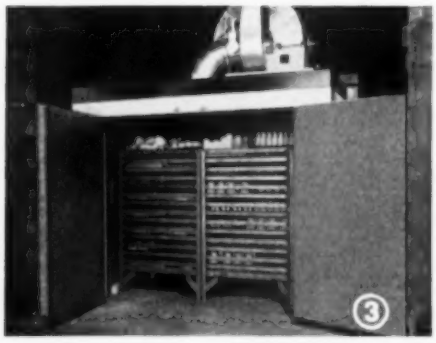




Foundry Ovens

for ALL FOUNDRY REQUIREMENTS

Whether your particular requirements concern core baking, pasting and mold drying, or ovens and air draw furnaces for casting conditioning and heat treating, the LANLY organization of experts is well qualified to serve you.

If a LANLY standard unit does not fit into your picture, we'll design and build one that will.

LANLY efficient convection type air heaters and balanced re-circulating systems are but two of the advanced design features which have attributed strongly to the ever growing acceptance of LANLY as an established authority in the field of foundry ovens.

Write for the Catalog containing a list of purchasers and an illustrated description of the entire list.

Some Typical LANLY Ovens

FIG. 1 — A Lanly Shelf Type Core Oven. This unit is heated by means of burners located directly under the work chamber. Available in several standard sizes.

FIG. 2 — A Two Compartment Car Type Mold Drying Oven. Each compartment individually heated and controlled.

FIG. 3 — A Rack Type Oven which accommodates two racks side by side with a single set of doors. Installed where space limitations do not permit separate openings for each rack.

FIG. 4 — Three Compartment Rack Type Oven is equipped with combination oil gas burner equipment. The change from oil to gas or vice versa can be made in a few minutes.

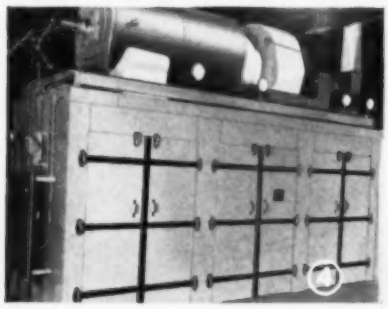
FIGS. 5 & 6 — A Combination Shelf. Drawer and Truck Type Oven. Heat is furnished by one efficient Lanly forced convection system.

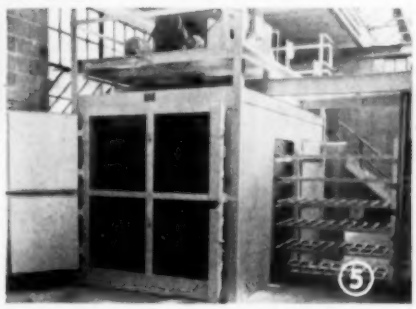
THE LANLY CO.

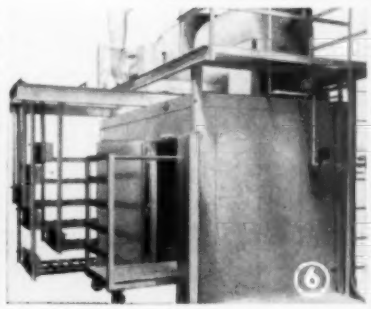
OVENS FOR INDUSTRY

HEATED BY GAS, OIL, ELECTRICITY OR STEAM

750 PROSPECT AVENUE · CLEVELAND, OHIO







Write for Bulletins on LANLY Finishing, Cabinet Type and Heat Treating Ovens

(*Concluded from page* 120)

impossible for such an individual to even try to explain to everyone in the place all the angles of his job and even harder for everyone to understand. Even if he was able to make it clear, there wouldn't be enough hours in the day to do it without letting the business go plumb to pot. Neither is there enough time for the top man to listen to all the angles of all his people's jobs and all they are up against, even though he would like to do it.

But in spite of all a manager and his lieutenants have got on their minds, the chances are they can come more nearly putting themselves in their people's shoes than vice-versa, at least as far as the old bread and butter is concerned. I know for a fact that the successful managers I have learned to know personally are hep to a whole lot more of what's going on in the place than most people suspect.

Anyway they must know enough of the lay of the land to keep the old pay checks coming to those they hired to do the chores and to pay the bills these folks keep running up. *I wouldn't be surprised that those who get most of the top men's time are those who get their work done without asking for any of it.* I still think that getting into the other fellow's shoes is a darned good thing provided we keep in mind that some of these shoes may be way too big for us to get around in.

REGIONAL FOUNDRY CONFERENCE

Program at Cleveland Announced

FIFTEEN technical sessions, in addition to two general sessions, a dinner and two luncheon meetings, are included in the schedule recently announced for the Ohio Regional Foundry Conference to be held in Cleveland, Mar. 11-12. The conference is sponsored by the Northeastern Ohio Chapter of the American Foundrymen's Association and Case Institute of Technology. Co-operating in the program are the Canton District, Central Ohio, Cincinnati, Toledo and Northwestern Pennsylvania Chapters of the AFA.

All of the technical sessions and general meetings will be held at Case Institute, 10900 Euclid Ave., Cleveland, while the luncheons and Thursday evening dinner are scheduled for the Cleveland Club, located in the nearby Tudor Arms Hotel, Carnegie Ave. and 107th St.

Registration, starting at 9 a.m. Thursday, will be conducted in the Physics building, where the opening meeting also will be held. The three gray iron sessions likewise are scheduled for the Physics building; malleable iron, steel and nonferrous sessions will be conducted in the Metallurgy building, and patternmaking sessions in the old Chemistry building. The detailed program follows:

Thursday, March 11

Registration .....9-10:30 a.m.

Opening Meeting ..... 10:30 a.m.
Chairman, H. C. Gollmar, Elyria Foundry. Welcoming addresses: Prof. K. H. Donaldson, Case Institute of Technology; Max Kuniansky, national president, AFA; William W. Maloney, secretary-treasurer, AFA. Address: "Recent Developments in the Foundry Industry," Frank G. Steinebach, editor, THE FOUNDRY.

Luncheon—Tudor Arms Hotel .....12 noon
Speaker: Dr. H. H. Davis, vice president, Ohio State University.

Gray Iron Session .....2:30 p.m.
Chairmen, J. G. Goldie, M.B.M. Foundry Inc., and F. W. Fuller, National Engineering Co. "Some Modern Trends in Cupola Operation," Thaddeus Giszczak, research metallurgist, AFA Cupola Research Committee.

Malleable Iron Session .....2:30 p.m.
Chairman, E. M. Strick, Erie Malleable Iron Co., Erie, Pa. "Cracks in Ferrous Castings, Their Causes and Possible Remedies," B. C. Yearly, National Malleable & Steel Castings Co., Cicero, Ill.

Steel Session .....2:30 p.m.
Chairmen, T. D. West, West Steel Casting Co., and Prof. Gerald Cover, Case Institute of Technology. "Recent Metallurgical Developments," Dr. C. H. Lorig, Battelle Memorial Institute, Columbus, O.

Nonferrous Session .....2:30 p.m.
Chairmen, Walter Bonsack, Apex Smelting Co. Cleveland Plant, and Walter J. Klayer, Aluminum Industries Inc. Cincinnati. "Commercial Aluminum Casting Alloys," Walter Sicha, Aluminum Co. of America, Cleveland.

Patternmaking Session .....2:30 p.m.
Chairman, V. J. Sedlon, Master Pattern Co. Discussion leader, F. C. Cech, Cleveland Trade School. "Use of Gypsum Bonded Molds," Morris Bean, Morris Bean & Co., Yellow Springs, O.

Educational Meeting .....4 p.m.
Chairmen, F. C. Cech, Cleveland Trade School, and G. K. Dreher, Foundry Educational Foundation. "Pre-selection Testing of Foundry Personnel," Prof. Eleroy Stromberg, Cleveland College. "Apprenticeship, Short Term Training, or Both?" J. C. Goldie, M.B.M. Foundry Inc. "What the University Contributes to Foundry Industrial Training," Prof. K. H. Donaldson, Case Institute of Technology. "Foundry Educational Foundation," G. K. Dreher, executive director.

Dinner—Tudor Arms Hotel .....7 p.m.
Speaker: E. A. McFaul, Northwestern University. Subject: "So You Think You're Slipping."

Friday, March 12

Gray Iron Session .....9:45 a.m.
Chairmen, H. J. Trenkamp, Ohio Foundry Co., and A. B. Barczak, Bardes Forge & Foundry Co., Cincinnati. "Casting Defects," W. B. McFerrin, Electro Metallurgical Co. Detroit.

Malleable Iron Session .....9:45 a.m.
Chairman, J. J. Witenhafer, Columbus Malleable Iron Co., Columbus, O. "Effect of Boron on Malleablization of White Iron," Joseph Micksch and H. A. Fabert, students, Case Institute of Technology.

Steel Session .....9:45 a.m.
Chairmen, T. D. West, West Steel Casting Co., and I. M. Emery, Massillon Steel Casting Co.; Massillon, O. "Hot Tears in Steel Castings," C. W. Briggs, Steel Founders' Society of America.

Nonferrous Session .....9:45 a.m.
Chairmen, Walter Bonsack, Apex Smelting Co. Cleveland Plant, and C. F. Bunting, Pitcairn Co., Barberton, O. "Brass and Bronze Foundry Practice," H. L. Smith, Federated Metals Division, American Smelting & Refining Co., Pittsburgh.

Patternmaking Session .....9:45 a.m.
Chairman, V. J. Sedlon, Master Pattern Co. Discussion leader, Peter Rettig, Rettig Pattern Works. "Patternmaking—Past, Present and Future," Ernest Kindt Jr., Kindt-Collins Co.

Gray Iron Session .....11 a.m.
Chairman, J. G. Goldie, M.B.M. Foundry Inc. "Mechanization in the Foundry," R. G. McElwee, Vanadium Corp. of America, Detroit.

Malleable Iron Session .....11 a.m.
Chairman, Edward Bossart, Maumee Malleable Casting Co., Toledo, O. "Modernization and Malleable Melting Practice," W. R. Jaeschke, Whiting Corp., Whiting, Ill.

Steel Session .....11 a.m.
Chairmen, T. D. West, West Steel Casting Co., and Prof. Douglas Williams, Ohio State University. "Steel Sands and Economy of Mixes," C. A. Sanders, American Colloid Co., Chicago.

Nonferrous Session .....11 a.m.
Chairmen, Walter Bonsack, Apex Smelting Co. Cleveland Plant, and G. N. Wright, John Harsch Bronze & Foundry Co., "Electronic Baking of Foundry Cores," J. W. Cable, Induction Heating Corp., New York

Patternmaking Session .....11 a.m.
Chairman, V. J. Sedlon, Master Pattern Co. "Plastics as Used in Patternmaking," Ladd Salach, Plastic Corp. of Chicago.

Luncheon—Tudor Arms Hotel .....12:30 p.m.
Speaker, T. Keith Glennan, president, Case

Department of Metallurgy Building, Case Institute of Technology

Foundry Developments

By EDWIN BREMER

MIDWESTERN foundry recently installed slag disposal systems for its several cupolas which eliminates the heat, dirt and steam of the former methods. Slag from the cupola falls into a refractory-lined trough where it meets water flowing from three nozzles at the rate of 800 gpm at 45 psi. This disintegrates the slag. The slag and water flow along the trough and drop through an opening in the floor onto a series of troughs arranged one below the other in the basement of the building, and then into a large pit 6 x 14 ft and 7 ft deep. Bucket conveyor removes slag and dumps it into a hopper truck for disposal. Total length of the trough system is 80 ft.

* * *

INSTEAD of using heavy firebrick for rebuilding an annealing furnace, a malleable shop decided to try insulating firebrick and high temperature insulation. With the old furnace the average annealing cycle required 120 hr with a firing time of 80 to 100 hr depending upon the quality of fuel available. After rebuilding the annealing cycle has been cut to as low as 72 hr, although it sometimes runs longer because the quality of the malleable iron varies, and the firing time has been reduced to 40 hr. As a result the firm is rebuilding the remaining five furnaces in the battery with insulating firebrick and high temperature insulation.

* * *

TRANSMUTATION, the ancient alchemist's dream, is now accomplished by nuclear fission. While the alchemist endeavored to transmute the base metals, such as lead, into gold, the modern scientist reverses the process by transmuting gold into a less noble, but not necessarily less valuable metal. Latest along that line is the transmutation of gold by neutron bombardment to form mercury 198, one of the seven isotopes of natural mercury, whose green radiation wave length forms a new and better standard of length, according to the National Bureau of Standards. In precision, reproducibility and convenience, the new standard is superior to both the standard meter and the red line of cadmium, according to recent investigations by Dr. William F. Meggers, National Bureau of Standards. Preliminary measurements have shown an accuracy of one part in a hundred million of relative values, and one part in a billion is theoretically possible.

* * *

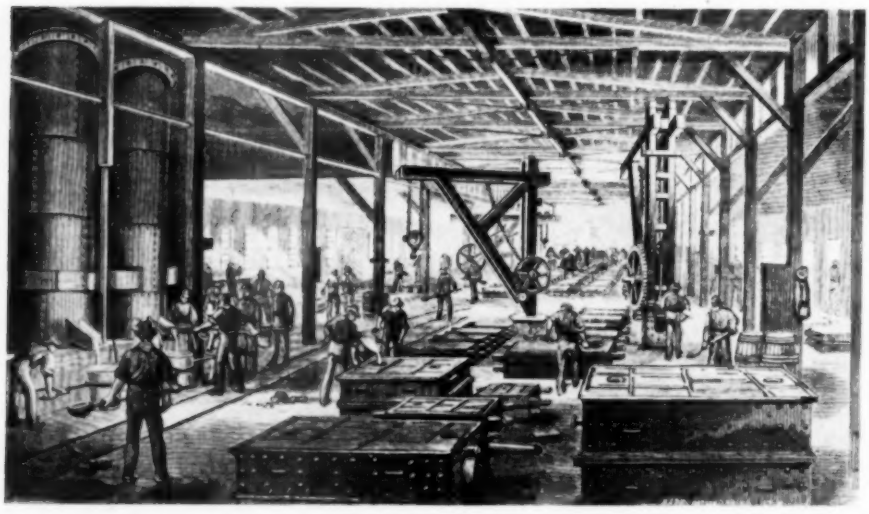
EXPERIMENTAL work by Westinghouse engineers indicates that refined molybdenum sulphide may have an application as a high temperature lubricant. A layer of the sulphide provides a cushion when applied to steel which aids in reducing the friction on moving parts in a manner similar to an oil film, but apparently not to the same degree. Advantage over the oil film is that it does not thin out with heat, and does not appear to oxidize readily. Also it does not appear to build up a nonlubricating film or coating under high temperature conditions. Molybdenum sulphide may be suspended in oils or in water by adding emulsifiers.

* * *

IN A short article on "Oxygen and The Combustion Process" in *Engineering Experiment News*, Ohio State University, Prof. William A. Mueller points out that dissociation of CO_2 and H_2O at high temperatures developed in steelmaking causes considerable reduction in the flame temperatures when oxygen replaces air. Also he mentions that as the furnace gases leave the high temperature zone of the furnace, recombination of CO_2 and H_2O liberates heat and causes the gases as they leave the furnace to be unnecessarily hot and harmful to exit ports and flues.

* * *

NEW RESEARCH tool designed to aid in the observation and measurement of surface conditions of metals, ceramics and plastics has been developed by the Special Products Division, General Electric Co. Called an electron diffraction instrument it is valuable in investigations of problems associated with metallurgy, surface deposits, corrosion, graphite, catalysts, lubricants and pigments. It differs from the x-ray diffraction instrument which analyzes thick specimens, in that the new instrument shows crystal structure of surfaces and thin specimens up to 500 Angstrom units. To operate, a beam of electrons is directed at the specimen being tested, and any resulting diffraction pattern is photographed. The pattern consists of rings whose diameter, intensity and orientation provide information for determining composition, orientation and size of crystals present.



CENTENARIAN: Allis-Chalmers Mfg. Co., Milwaukee, known as a producer of the world's largest line of major industrial products, is 100 years old. The company was established by Edward P. Allis, who in 1861 acquired the 14-year-old French burr mill stone firm of Decker & Seville in Milwaukee. In 1901 the company was merged with Fraser & Chalmer Co. and Gates Iron Works, both Chicago, and Dickson Mfg. Co., Scranton, Pa., to form the Allis-Chalmers Co. The above reproduction of a woodcut is a view of the Edward P. Allis & Co.'s Reliance Works main foundry during the late 1800's

Molds are formed and assembled on Logan Roller Conveyor lines at molding machines in rear. After closing they are pushed to pouring zone in foreground. Rolls in pouring zone are equipped with shot shields as a protection against fouling from spillage of metal during pouring operations.

Production machinery..

not just auxiliary equipment

"A GREAT IMPROVEMENT" on wheelbarrow and push truck—was the first industrial conveyor. Yet it was only transportation.

Today, well-planned material handling equipment is regarded as basic production machinery. In fact, Logan Conveyors have become such an integral part of molding, pouring, and machining as to be considered indespensable in hundreds of foundries.

Conveyors provide "flow," a continuous movement of material directly from process to process, at convenient working heights, and at big savings in manpower, time and floor space.

Wherever you are, whatever you make, the chances are that Logan equipment can effect cost savings and efficiencies at two, three, or more of your foundry operations.

Logan Conveyors

LOGAN CO., INC., 580 CABEL ST., LOUISVILLE 6, KENTUCKY

Around DETROIT

By A. H. ALLEN
Detroit Editor
THE FOUNDRY

Foundries have been the neglected stepchild of U. S. industry . . .
Thousands of working people, however, like foundry work . . . .
A look at a 1968 model automotive castings plant

THE foundry has been a stepchild of U. S. industry. For many years executives in industry always have looked the other way when foundry problems were mentioned, with the result that today some of the larger captive gray iron plants are in difficulties as far as adequate supervision is concerned.

During the war, government officials reveled in derogatory and sneering remarks directed at castings plants. Then union leaders took the bit in their teeth and raced off on a campaign of hate against foundry bosses who were "sweating the life out of helpless workers." Thousands of foundry workers during the war jumped at the chance to become machine hands where all they had to do was sit on a comfortable stool and press buttons. And they resisted efforts at the war's end to move them back into the foundry.

Slogans will not make the average foundry a plushy place for anyone to seek employment. This is no indictment of the industry. Someone has to make the castings; and it is a tough, muscle-pulling job. So is working around a blast furnace, an open-hearth furnace, a coke oven battery, a cement plant or a coal mine. There are thousands of working people who prefer the rough and tough jobs and who probably resent anyone feeling sorry for them. And there always will be such persons for whom hard work is a pleasure and who would be ill-fitted and ill-at-ease in any other type of employment.

With the new year in full swing, it may be a time for taking a long look ahead at the automobile castings plant of 1968. Certainly no one will agree the foundry industry has been stagnant since the days of Tubal-Cain (as one engineer has charged), or even since as recently as 1928. So let's do a little fanciful imagineering, to borrow a term from Chrysler.

Perhaps this is your automotive castings plant of 1968: Up there in the control pulpit behind that panel of flashing lights and pushbuttons is the production engineer. Stretching out in front of him is the foundry. Over there, those horizontal cylinders connected to the bussbars and the oxygen pipelines, are the melting units. We melt with electricity and oxygen (incidentally, Chevrolet Gray Iron Division is experimenting with oxygen in the cupola to see what it will do; and there will be a technical paper on the subject at the annual AFA convention).

The melting furnaces are all charged automatically and produce a heat of scrap and pig iron in approximately 20 minutes, the hot iron being piped to pouring stations along the main castings line. What kind of pipe? Ah, you have never heard of futurium, that new alloy impervious to any temperature up to 3500° F?

THE NATIONAL SOCIETY FOR CRIPPLED CHILDREN AND ADULTS, INC.
11 S. La Salle St., Chicago 3, Illinois

And what are those gargantuan machines over there beyond the melting station? Nothing more than autocasts—special machines, operated by electricity and hydraulics, with futurium molds which receive hot iron and die cast it to any shape, any section, any size. All automatic, they cycle a cylinder block, head, flywheel or multiple small parts die cast in a matter of minutes.

How do we cool these heavy sections? Right in the mold, by means of induction cooling. Never heard of induction cooling? well, you remember induction heating, with the induction coils wrapped around the part, etc. Same thing, except that the coils now induce cooling instead of heating. How can you do it? Well, that was a trick our atomic scientists stumbled across in their research with uranium hexafluoride and related materials. Proved to be the simplest thing in the world and revolutionized the refrigeration industry. If atomic power could be used to generate heat, then it could be harnessed to produce cold. The answer was discovered back about 1960.

Inspect Near Perfect Castings

So the castings are ejected from the autocasts and move direct to the inspection tables where the castings, with a finish you would swear was machined and ground, pass under the penetrometer, which checks internal soundness. It is not an x-ray but rather a scanning head which moves over the casting, and an arrangement of targets beneath the table hooked up to electronic tubes, relays and indicators which show at a glance the minutest internal defect in the casting. Seldom do any serious flaws develop in these castings, a 100 per cent inspection is relatively inexpensive.

And science has moved into the foundry in a big way. Two solid floors of laboratories covering everything from theoretical to production research—and research not only into the machines and metals that make the casting, but into the men behind them as well. This was what Doc Ralph Lee and others were calling human engineering or humanics back in 1948. It has paid off handsomely. Our foundry today is manned by trained scientists and engineers thoroughly schooled in all the ramifications of castings design, heat balances and metal behavior. While there may still be an art to foundry technique, science—practical and applied—has long since taken over the driver's reins.

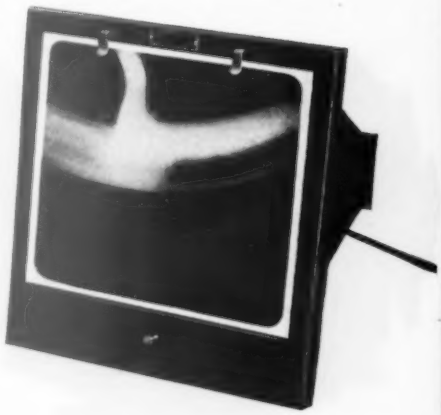
Fantastic? Today, of course; tomorrow, who knows? Certainly then there would be no question that the foundry would be a "good place to work"—except that all the "work" would be done by electricity, transfer tables and machines into which some machine designer had poured his life's blood. Even today much of yesterday's manual toil in the foundry has been delegated to the machine—the mechanized brain and brawn. There is no other way the trend can go but toward greater assumption of the burdens of the foundry by the machine.

Sound repair welding of castings can be assured

Many faulty castings can be salvaged, made sound, by proper repair welding. How do you assure the soundness of repair welds? By radiographic examination—either by x-ray or gamma-ray (radium) exposure.

. . . when accurate "before-and-after" appraisals are made with radiography

The nature and location of defects are quickly and accurately shown on the radiograph for chipping and welding . . . lack of penetration, gas and slag pockets, or other welding irregularities can be determined after the job is completed. With radiography you can be assured your welds are safe and sound.



For maximum radiographic visibility . . . use Kodak Industrial X-ray Films

Kodak Industrial X-ray Films have the high radiographic sensitivity—the extremely high contrast and fine graininess for the detail visibility necessary in critical radiographic inspection.

. . . they are especially adapted to your requirements

Kodak Industrial X-ray films are designed to meet every normal x-ray requirement:

Type F . . . with calcium tungstate screens—primarily for radiography of heavy steel parts. For the fastest possible radiographic procedure.

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Kodak

Activities of Foundry

GROUPS

Twin City

JAN. 8 meeting of the Twin City Chapter of the AFA was held at the Hopkins, Minn., plant of the Minneapolis Moline Power Implement Co.

Approximately 150 foundrymen and guests were treated to a full afternoon and evening of entertainment, including a plant visitation, a delicious dinner, and a timely speech by C. R. Simmons, sales engineer of the Durez Plastics & Chemicals Corp.

Mr. Simmons discussed the role of plastics in patternmaking, dealing specifically with the liquid phenolic type of plastic. He actually cast a small pattern during his discussion.

According to Mr. Simmons, these accelerated phenolic resins are used not only for patternmaking but also for assembly jigs and fixtures, light metal dies, and plating shields.

For large patterns approximately 4 per cent acid accelerator is necessary. The liquid resin and accelerator are mixed together, and the plaster mold cavity is filled with this material. The mold is allowed to stand for a few hours and then baked at 140°F for 4 hours.

The phenolic resin may be poured in wood or glass molds instead of plaster. Mr. Simmons cautioned against the use of any metal molds other than lead, because of the possible acid accelerator reaction on the metal.

If a plaster mold is used, the plaster must be first coated with Nucomite or Tygon and then waxed.

Mr. Simmons stated that this "unfilled resin" had low shrinkage properties, but instructions must be followed carefully in order to make a successful pattern. He warned against the manufacture of patterns which have heavy masses or thin fins.

The "patchability" of broken resin patterns was stressed in a series of slides shown near the close of the meeting. Other advantages listed are: Low initial cost; easy duplication; smoother mold surface, more easily fabricated.—*O. J. Myers, Werner G. Smith Co.*

Central Illinois

PATTERNS and Patternmaking was the subject considered at the Feb. 2 meeting of Central Illinois Chapter of the AFA, held at the Jefferson Hotel, Peoria, Ill. J. E. Kolb, Caterpillar Tractor Co., Peoria, and a national director of AFA, acted as technical chairman and presented V. J. Sedlon, president, Master Pattern Co., Cleveland, guest speaker.

Mr. Sedlon stated that foundrymen need to understand how patterns are made, and some of the basic problems of a patternmaker. Co-operation between engineering departments and pattern shops is essential to achieve satisfactory results as far as the ultimate machined casting is concerned. The speaker discussed the cost factor involved and stated that cutting down pattern cost may be false economy. It is just as foolish to make elaborate metal equipment to produce 50 or 60 castings as it is to make loose wood pattern equipment to produce 1000 casting. If production requirements warrant, a complete metal pattern reduces over-all cost of the finished product, just the same as a

(*Continued on page* 130)

TWIN CITY Chapter of the AFA held its annual Christmas party Dec. 12 at Raddisson Hotel, Minneapolis. A social hour and refreshments preceded an excellent buffet supper which was followed by numerous acts of vaudeville providing an evening of enjoyable relaxation. Some of the 400 members and guests who attended are shown here. Photos courtesy of Pufahl Foundry Inc., Minneapolis

FREE WORKING

- INCREASES PERMEABILITY
- DECREASES DRYING TIME

Foundry management, watching mounting costs, sees profits in MOGUL. This perfect Green Bond makes money because it decreases drying time, yields smooth cores and reduces discards. MOGUL works profitably with pitch or resin because cores can be handled warm. For both green and dry strength use MOGUL in cores.

CORN PRODUCTS SALES COMPANY
17 BATTERY PLACE • NEW YORK 4, N. Y.

(*Continued from page* 128)

machine tool. Pattern cost should be prorated in the total cost of castings.

The speaker stated that it is impossible to set up a hard and fast rule for selecting the proper kind of a pattern. Each case must be handled individually and it must fit the job it is required to do. Core, molding and cleaning problems should be considered and this is accomplished by contacting people concerned in those departments. It must be remembered that in selecting pattern equipment, cost of the pattern is controlled by the hours spent on it and not solely by material. The speaker used slides to illustrate some of his points.

During the coffee hour the group enjoyed showing of a film provided by the Pangborn Corp., Hagerstown, Md., entitled "Rotoblasting at Ford's." —*V. W. Swango.*

Ohio State

THE third student chapter of the AFA was installed at Ohio State University, Columbus, Jan. 13. W. W. Maloney, National AFA secretary-treasurer, presented the cast iron rattle, symbol of a baby chapter, to William Dundon, student chapter chairman. Other student officers are Thomas Dole, vice chairman, and Eldon Boner, secretary-treasurer. The chapter has 21 active members.

Industrial advisers for the new chapter are: J. J. Witenhafer, Central Ohio Chapter; J. Shumacher, Cincinnati District Chapter; V. E. Zang, Toledo Chapter; E. H. Taylor, Canton Chapter, and J. H. Tressler, Northeastern Ohio Chapter. Faculty advisers are: Prof. D. C. Williams and Prof. R. P. Schneider.

Guests at the installation in addition to Mr. Maloney were: W. B. Wallis, national AFA vice presient; H. F. Scobie, AFA educational director; G. K. Dreher, executive secretary, Foundry Educational Foundation; C. E. MacQuigg, dean of the Engineering College, Ohio State University; Dr. P. N. Lehoczky, chairman, Department of Industrial Engineering; Ray Frank, chairman, Central Ohio Chapter; F. W. Fuller, vice chairman, Central Ohio Chapter; Mr. Witenhafer; Mr. Zang and Mr. Tressler.

Guest speaker at the installation meeting was J. B. Caine, Sawbrook Steel Castings Co., Lockland, O., who spoke on "The Advantages and Disadvantages of Working in the Foundry."

Mr. Caine stated that the foundry industry offers a new frontier for the technical man, but he must contend with its indifference to modern development. This technical man must sell his improved foundry methods to management, and at the same time sell other industries on the use of castings. According to Mr. Caine, industry can use five times the number of castings currently being employed.—*Eldon Boner.*

INSTALLATION of the Ohio State University Student Chapter of the AFA was held Jan. 13 at Columbus, O. Photos taken at the installation meeting are by courtesy of Wilfred H. White, Jackson Iron & Steel Co.

Canton

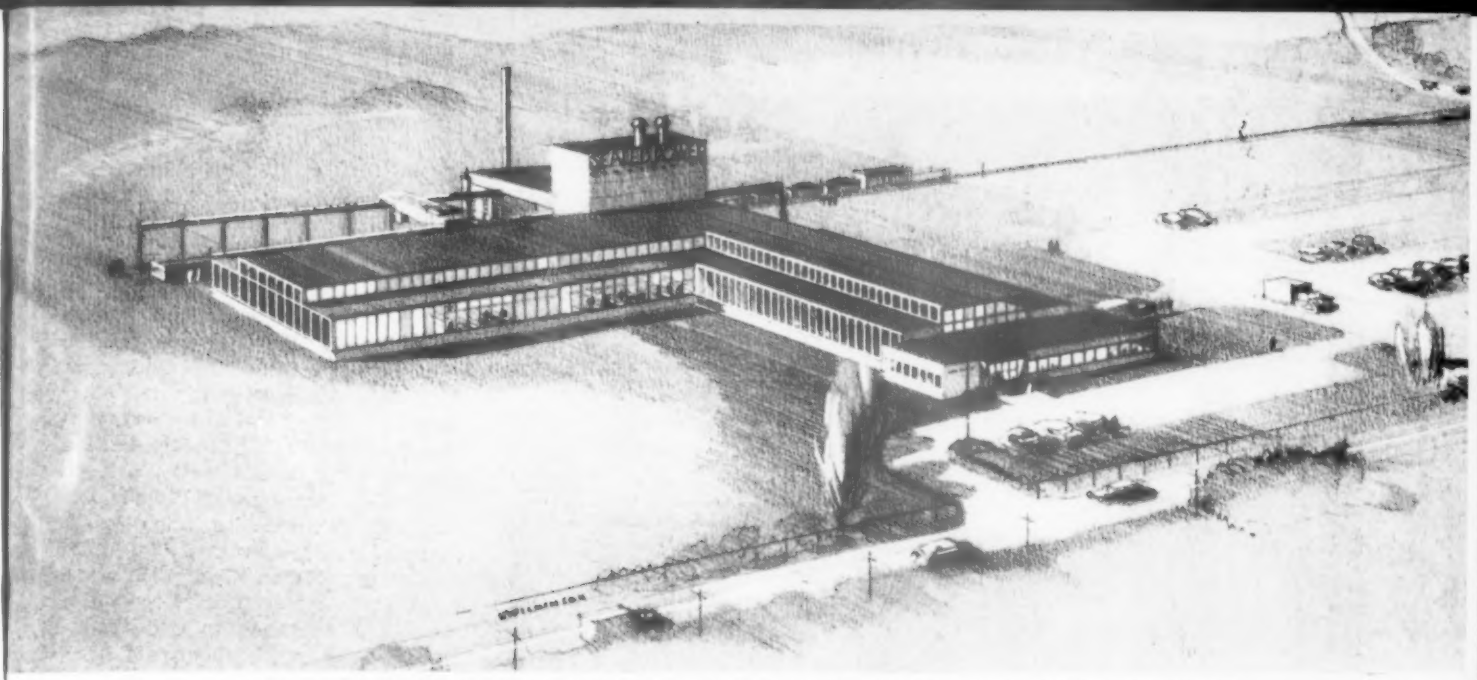
A PROBLEM, submitted to members several days prior to the meeting, was the basis of discussion by members of Canton District Chapter of the AFA, Jan. 15, at Massillon, O. The 96 members present entered into solving the problem of "How to make 100 castings of a 4-in. cam actuated throttle valve for temperature control spray, 1500 psi water pressure—material to be steel, gray iron, malleable iron or bronze."

Blueprints and information on the problem were furnished by George Biggert, United Engineering & Foundry Co., and M. G. Winters, Winters Foundry & Machine Co., Canton, O.

L. P. Robinson, Werner G. Smith Co., Cleveland, presented a coffee talk entitled "Love Life of a Pullet."

Chapter Chairman Charles F. Bunting, Pitcairn Co., Barberton, O., outlined plans for chapter co-operation with Canton public schools in an educational program in which high school students would make actual foundry observations during training

(*Continued on page* 132)



BEING ENGINEERED — PISTON RING FOUNDRY AT IONIA, MICHIGAN FOR SEALED POWER CORPORATION

CO-OPERATION

A new project . . . for whose design a co-operative effort between the Sealed Power Corporation and Giffels and Vallet, Inc. is operating . . . based on production objectives; all phases of foundry layout, sand conditioning design, equipment engineering, and building engineering are being developed using the skills of these two organizations in order that the best possible Piston Ring Foundry will be created . . . so that the capital invested will bring greatest results quickly.

GIFFELS & VALLET, INC.

INDUSTRIAL ENGINEERING DIVISION
1000 MARQUETTE BUILDING, DETROIT

BIRMINGHAM District Chapter of the AFA heard B. P. Mulcahy, consultant on cupola operation and coke, Indianapolis, discuss "Foundry Coke and Cupola Operation" at Tutwiler Hotel, Birmingham, Jan. 16. In top photo, left to right, are Dr. James T. MacKenzie, American Cast Iron Pipe Co., Birmingham, and Mr. Mulcahy. Bottom, lift to right, are C. P. Caldwell, Caldwell Foundry & Machine Co. Inc., Birmingham, and Prof. E. C. Wright, metallurgical department head, University of Alabama, coffee speaker at the meeting

(*Continued from page* 130)

in industrial arts courses. Education committee is composed of Ernest Lancashire, Clark Castings Co., Canton, and Mr. Biggert.—*Nils E. Moore, Wadsworth Testing Laboratory.*

Philadelphia

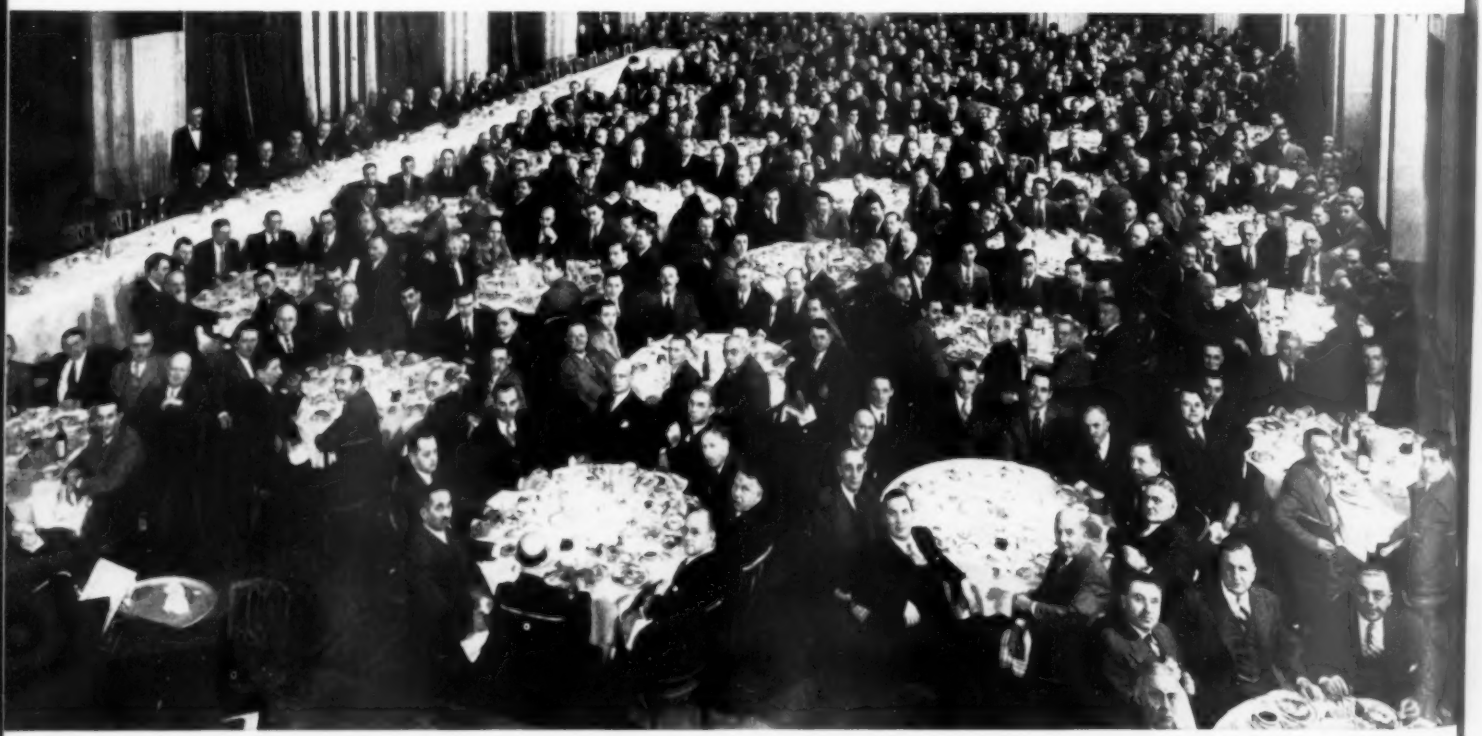
OVER 200 members and guests of Philadelphia Chapter of the AFA attended the Jan. 9 meeting at Engineers Club, Philadelphia. After a coffee talk by Hermann Good, Textile Machine Works, Reading, Pa., the group divided into two sections.

George Bradshaw, Philadelphia Naval Yard, was discussion leader at the gray iron session. Co-leader was B. A. Miller, Cramp Brass & Iron Division, Baldwin Locomotive Works. Discussion centered around making castings without pig iron, making synthetic pig iron, cupola controls, gating problems and cleaning room problems.

Discussion leader at the steel section was Jack Csaklos, Crucible Steel Casting Co., with Clyde Jenni, General Steel Castings Co., as co-leader. Subjects discussed included pouring devices for the shank floor, core washes, casting defects, pressure molding in a vacuum, pouring steel in a controlled atmosphere and core blowers.

The nonferrous panel was led by J. Roberts, American Manganese Bronze Co., and D. Bryden, Philadelphia Bronze & Brass Corp., was

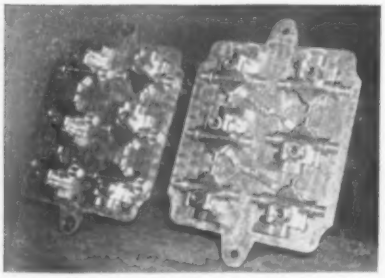
(*Continued on page* 134)



PHILADELPHIA Chapter of the AFA held its Christmas Party at Benjamin Franklin Hotel, Dec. 16

Part of our Milling Machine Section where numerous units of equipment and skilled workmen handle a wide range of work.

A view of our Duplicating Equipment used in the production of high precision patterns.



Typical all-machined pattern. This one consists of six brass patterns mounted on cope and drag steel plates.

Here is Where You Start to Save $$ on Patterns

Right here in our Chicago plant where we are completely-equipped for the fast production of *all-machined patterns* . . . . patterns which cost far less for maintenance, patterns which speed up mold production (as cores drop into place "right"), patterns which produce castings that "fit the jig" (in the machine shop) with unerring accuracy. We say—*the patternshop is the foundry's "toolroom."* Here is where you start to make money! We invite your inquiry.

Why Not Pay Us A Visit?

* You are cordially invited to inspect our facilities anytime you are in Chicago. Come in and see some of the interesting work we have in progress and tell us your problems. Our Pattern Engineering Service is at your disposal.

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PATTERNS FOR PRODUCTION—PATTERN ENGINEERING SERVICE

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(*Continued from page* 132)

co-leader. Discussion covered molding, coremaking, cleaning and radiographic inspection of bronze castings. —*Jack L. Furey, Swan-Finch Oil Corp.*

Central New York

ROUNDTABLE discussions characterized the Jan. 9 meeting of Central New York Chapter of the AFA at Onondaga Hotel, Syracuse, N. Y. One hundred and ten members and guests participated in the session.

James O. Ochsner, Crouse-Hinds Co., conducted the gray iron session assisted by Marshall B. Dewey, Cayuga Cordage Co., on general foundry practice; Lionel Werner, Crouse-Hinds Co., on pattern equipment and gating, and Adam Mahonske, Elmira Foundry Co., on cupola operations.

Three talks were presented at this meeting: Mr. Ochsner on the transition of foundry operation from an art to a science, and the need of cooperation of both the old and the new for successful production of quality castings; Mr. Mahonske on "The Use of Anthracite in the Cupola;" and E. G. White, Crouse-Hinds Co., on "Liquid Propane Fuel for the Coreroom."

Dave Wuerthle, A. P. Green Fire Brick Co., presided at the malleable iron session. Chief discussion topics were the values of various annealing methods and the proper selections of insulating materials.

W. B. George, R. Lavin and Sons, handled the nonferrous session and presented a chart showing an approved method of figuring cost per pound of brass and bronze castings for jobbing foundries. The discussion period covered casting defects, furnace operations, pouring temperatures and gating and risering.—*John A. Fcola, Crouse-Hinds Co.*

Northwestern Pennsylvania

NORTHWESTERN Pennsylvania Chapter of the AFA heard George P. Halliwell, H. Kramer & Co., Chicago, discuss nonferrous metals Jan. 26 at the Moose Club Blue Room, Erie, Pa.

L. E. Hoyes, National Bearings Division, American Brake Shoe Co., Meadville, Pa., led a spirited discussion following Mr. Halliwell's talk.

Preceding the technical talk, the Saint Pauls Octette, a group of male voices, presented a selection of modern and old time songs.

The schedule of meetings for the balance of the season includes talks by O. J. Meyers, Werner G. Smith Co., Mar. 22; M. T. McPherson, Gould Coupling Co., Apr. 26, and Frank G. Steinebach, THE FOUNDRY, May 24. —*Earl M. Strick, Erie Malleable Iron Co.*

Chicago Non-Ferrous

JAMES CROSSER JR., chief engineer, Industrial Hygiene Unit, Division of Factory Inspection, Department of Labor, State of Illinois, addressed members of Chicago Chapter of the Non-Ferrous Founders' Society Jan. 8 at the Machinery Club of Chicago. His subject was "What We Expect of Nonferrous Foundries Relative to Health and Safety."

Stressing the desire for co-operation between his department and industry in securing compliance with the rules to correct violations of the code, Mr. Crosser stated that these rules were drawn up by a joint advisory committee consisting of seven representatives of foundry employers and seven representatives of labor. He explained that the code is almost a duplicate in its health and safety features of the American Foundrymen's Association code.

He went on to say unemployment compensation claims are a chief source for investigations. In the last

(*Continued on page* 137)

TIMBERLINE: At left, left to right, are C. A. Sanders, American Colloid Co., Chicago, speaker at the November meeting of Timberline Chapter of the AFA; Chapter Chairman J. L. Higson, Western Foundry, Denver, and Chapter Secretary C. E. Stull, Manufacturers Foundry Corp., Denver. Below are additional views of the November meeting and also of the chapter's Christmas Party, Dec. 16

Highest Quality Steels
MADE WITH VANCORAM FERRO VANADIUM

The high quality of Vancoram Ferro Vanadium, consistent from lot to lot, assures the steelmaker closer control during production and a finished product of unexcelled microstructure and physical properties. The alloy is produced in the following grades to meet the requirements of various products and manufacturing technics:

	Typical Composition
GRADE "A" *(Open Hearth)*	Vanadium . . . 35-40% Silicon . . . . max. 12% Carbon . . max. 3.50%
GRADE "B" *(Crucible)*	Vanadium . . . 35-45% Silicon . . . max. 3.50% Carbon . . max. 0.50%
GRADE "C" *(Primos)*	Vanadium . . . 35-45% Silicon . . . max. 1.25% Carbon . . max. 0.20%
HIGH V GRADES	Vanadium . . . 50-55% 60-65% 70-80% Silicon . . . . . Low Carbon . . . . . Low

Large stocks are carried of all grades of alloys, and they can be supplied in any of the standard lump, crushed, or mesh sizes.

Our metallurgists will be glad to assist you in the application of Vancoram Ferro Vanadium to meet your specific requirements.

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A comprehensive survey will, without question, disclose ways and means to introduce new methods, power driven labor saving machinery and devices to cut cost in all departments, beginning with incoming raw material and following through to the shipping platform. We are in a position to render this service, and will submit a report with tentative recommendations, supplemented with plans and specifications.

Upon approval of the tentative layout we prepare complete plans and specifications covering the entire project, including building alterations or extensions, also heating, plumbing and wiring for light and power.

With this information before you, quotations and bids can be obtained from many sources on a strictly competitive basis, and all bidders will quote on the same item. Your own organization will award contracts and issue all purchase orders. Installation and erection can be performed by your own men, under our supervision, using our working drawings for guidance. No one outside your own organization will have access to any information relating to these improvements.

By following our methods you will complete a plant modernization or expansion project at the lowest cost and without loss of time. Further, all uncertainties are eliminated and you are not depending upon one make of equipment or one source of supply, when replacement parts are needed or when alterations or expansions are in order.

Many nationally known firms will vouch for our ability to carry out improvements and assist in correcting wasteful foundry operations and practices. Twenty years of uninterrupted practice as foundry engineers has established the economic value of our experience and service. Our production analyses, reports and recommendations are sound and impartial. We have nothing to sell except expert counsel and service, directed solely to the interests of our clients.

Our brochure and planographic reproductions of modern plants designed by us should be of interest to you. Let us send you our Bulletin "F".

A. A. WICKLAND & CO.

Foundry Engineers.

ENGINEERING BUILDING — Established 1919 — CHICAGO 6, ILLINOIS

(*Continued from page* 134)

seven years justifiable claims have dropped from approximately 78 per cent to a present low of 48 per cent, indicating a great saving to the industry.

Chapter officers for 1948 are: John K. Hodgson, Hodgson Foundry Co., Chicago, chairman; Charles Leitelt, Leitelt Bros. Inc., Chicago, vice chairman, and H. A. White, Smeeth-Harwood Co., Chicago, secretary.

Eastern Canada and Newfoundland

EASTERN Canada and Newfoundland Chapter of the AFA met Jan. 9 in the Brittany Room, Mount-Royal Hotel, Montreal. Program was a technical quiz program with a panel of experts to answer questions. J. Grieve, Dominion Engineering Works, was technical chairman.

Members of the panel were: Ewing Tait and W. Bennet, Dominion Engineering Works; Bill Birks, Crane Ltd. and T. Shute and J. McCallum, Canadian Car & Foundry Co. Ltd.,—all of Montreal; Eric Winsboro and G. W. McLeary, Shawinigan Foundries Ltd., Shawinigan Falls, Que., and William Forest and M. Chicoin, Robert Mitchell Co., St. Laurent, Que.

Referees H. Louette, Warden King Ltd., and A. E. Cartwright, Crane Ltd., both of Montreal, awarded two prizes where they thought the panel did not give entirely a positive answer. Prize winners were Mr. Shute and C. Rowe, Crane Ltd.—*H. E. Francis, Jenkins Bros. Ltd.*

New Jersey

FOUNDRIES will have to develop still greater skill and "know how" in facing the problems that lie ahead as a result of stringency in raw materials, particularly pig iron and scrap, Donald J. Reese, metallurgical engineer, International Nickel Co., New York, told members of the New Jersey Foundrymen's Association at their regular monthly meeting in Newark, N. J., Jan. 19.

He indicated that supplies of raw materials would become increasingly critical in the months immediately ahead and may continue so for a long time. Even with the advent of milder weather, foundry scrap will continue to fall short of requirements, and he saw little improvement in pig iron shipments throughout the remainder of the winter and possibly for some time after that, as extensive repair programs are still necessary.

He suggested close attention to methods of charging fuel and metal and to speed in operation of the cupola. Much often depends on the kind of coke used and the amount of coke. In meeting the necessary needs of carbon and silicon in using excessive amounts of scrap—excessive as gaged by ordinary standards—foundrymen must pay closer attention to the chemical specifications of material used.

As a matter of fact, Mr. Reese said,

BOSTON chapter of the Non-Ferrous Founders' Society held its annual Christmas party Dec. 10. Photos courtesy D. J. Davies, D. W. Clark & Co.

foundry practice provides considerable latitude in the choosing of necessary metallics. He asserted that a number of foundries throughout the country, as usual practices, use scrap entirely, to the exclusion of pig iron, due to one reason or another, and have been successful in making good castings. He estimated that possibly 500 foundries or so actually accept as normal certain of the conditions about which most foundries now complain. —*Ben K. Price*

Wisconsin

SECTIONAL meetings were held by Wisconsin Chapter of the AFA Jan. 9 at the Crystal Ballroom, Hotel Schroeder, Milwaukee, with 252 members and guests present.

H. W. Dietert, Harry W. Dietert Co., Detroit, addressed the technical and gray iron group on "Physical Properties of Sand and Their Relation to Casting Defects." Kenneth Geist, Allis-Chalmers Mfg. Co., Milwaukee, was group chairman.

At the malleable iron meeting, G. Antonic, Walter Gerlinger Inc., Milwaukee, spoke on "The Cost of Natural Bonded Sand in the Nonmechanized Foundry Compared to the Cost of Synthetic Sand in Mechanized Foundries." B. K. Gatenski, Milwauke Malleable & Grey Iron Works Inc., Milwaukee, was chairman.

Members of the nonferrous group heard Orville Laabs, Universal Foundry Co., Oshkosh, Wis., talk on "Attracting and Holding Desirable Employees in the Foundry." Carl Van Buren, Allis-Chalmers Mfg. Co., was chairman at this session.

Walter Simon, Industrial Commission of Wisconsin, Madison, Wis., addressed the pattern group on "Indenturing Problems of Patternmaker Apprentices." Chairman was James Gregerson, Gregerson Mfg. Co. and Milwaukee Vocational School.

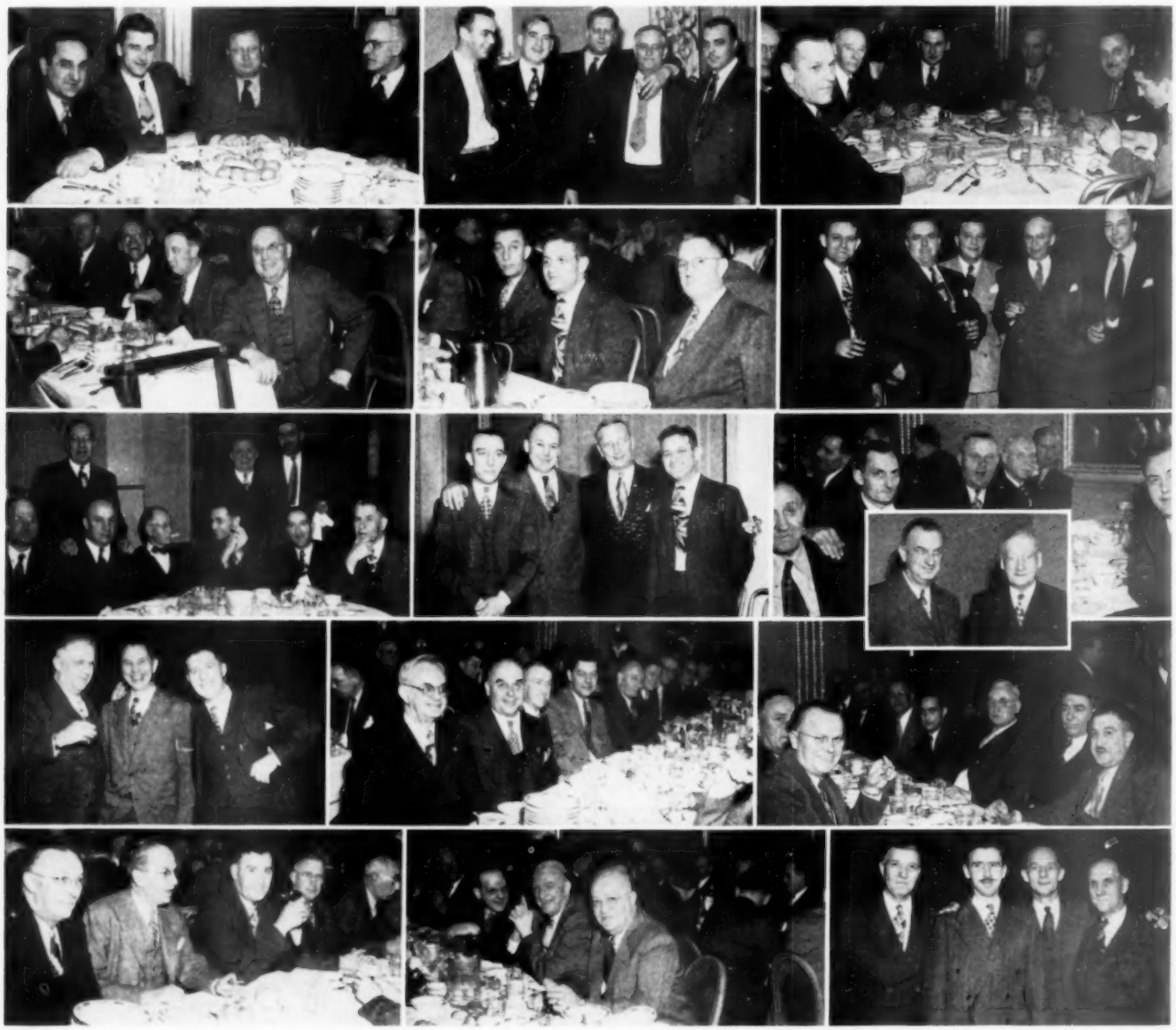
The steel group heard Dean Van Order, Burnside Steel Foundry Co., Chicago, speak on "Job Costing in a Miscellaneous Steel Foundry." Erwin Tetzlaff, Pelton Steel Casting Co., Milwaukee, acted as chairman.—*John E. Hubel.*

Texas

AT THE Jan. 23 meeting of the Texas Chapter of the AFA, held at Hotel Beaumont, Beaumont, Tex., L. P. Robinson, director of core oil sales, Werner G. Smith Co., Cleveland, discussed "Variables in Corerooms, Their Treament and Cure."

Mr. Robinson pointed out the eight variables which may occur in the manufacture of cores, namely: Type

(*Continued on page* 140)

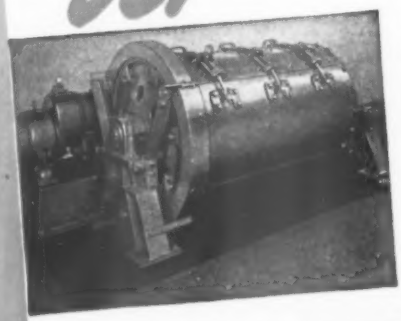


WISCONSIN Chapter of the AFA held its Christmas Party Dec. 12 at Schroeder Hotel. Photos shown above were taken at the party by John Bing, A. P. Green Fire Brick Co.

For Cleaning *Faster, Better* and at *Lower Cost*

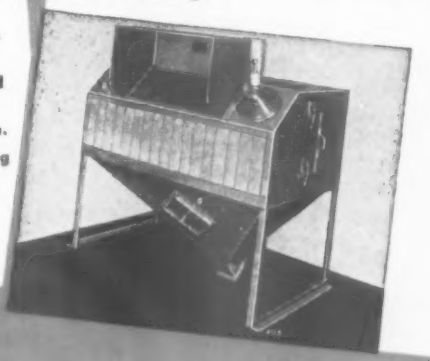
Choose from the SLY Complete Line of Foundry Cleaning Equipment

SLY TUMBLING MILLS



1. Heavy forged steel trunnions, extra heavy roller bearings.
2. Special door locks — easily operated.
3. Extra heavy gearhead motor.
4. Integral motor platform.
5. Loading and unloading from either side.

SLY BLAST CABINETS



1. Two lights mounted at front to illuminate castings.
2. Operator's eyes shielded by protective hood.
3. Easy loading and unloading of castings.
4. Used for thorough cleaning of small and intricate parts, or as an auxiliary to larger units.

SLY BLAST ROOMS

1. Overall down-draft ventilation.
2. Ample illumination.
3. Lined throughout with 3-16" wear plates.
4. Floor of grating and perforated plates.

SLY "UNIT" DUST COLLECTORS

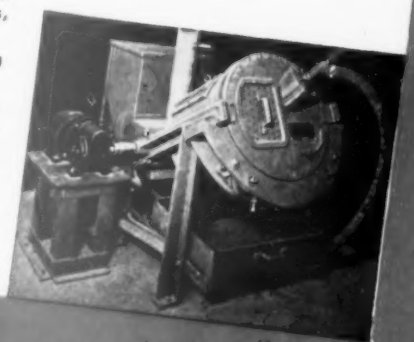
Small, compact cloth type dust filters for grinders and other small dust sources. Made in ten sizes for air volumes from 400 to 6000 C.F.M.

SLY DUST FILTERS

1. More filter cloth—hence greater filtering capacity.
2. Filter bags under tension (patented) insure: (a) minimum resistance to air flow, and (b) complete dust removal.
3. Simpler shaker mechanism—less moving parts, less maintenance.
4. Bags more easily replaced.
5. Automatic control — any degree.

SLY BLAST MILLS

1. Handles quantities of castings, forgings, stampings, hardened steel parts.
2. Tilted barrel with rolling action.
3. Convex perforated bottom plate forms bottom of barrel.
4. Work is constantly turned bringing bottom pieces to top.
5. Stationary head of barrel has large door for loading.



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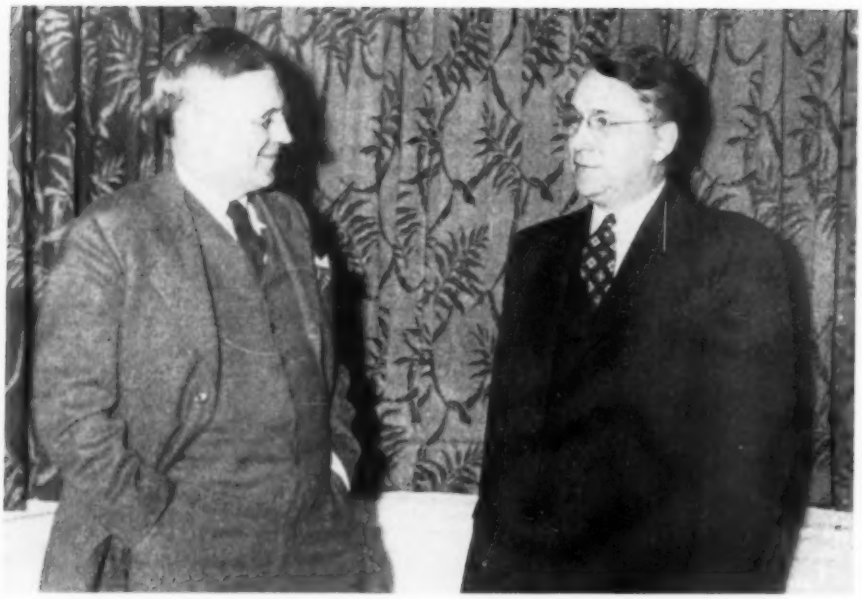

Willard Potter (left), secretary, Jackson Iron & Steel Co., Jackson, O., and Frank G. Steinebach, editor, *The Foundry*, at Dec. 15 meeting of Central Ohio Chapter, AFA, at which the latter was principal speaker

(*Continued from page* 138)
of sand used, binders, ratios, mixing and mulling, moisture content, variables of baking, venting, and inspection.

A study of various types of sand used in the manufacture of cores indicates a need for foundries to standardize on the sand which meets specific requirements. Only the amount of cereal binder required for a green bond strength should be added to the core mix, and ratio of the mixture is a variable which may cause serious trouble, especially if volume measurements are used. Mr. Robinson recommended that all mixes be prepared by weight to maintain constant ratios.

The speaker pointed out that if core mixes are mulled too long their strength decreases. Some foundries use time switches to control mixing time. Percentage of moisture in core sand mix is also a variable and should be controlled, depending on type of core operation used. In discussing baking cores he stated that core oil manufacturers should advise customers the temperature that cores from their oils should be baked, as high baking temperatures may lead to surface hardening before interiors are properly baked.

In speaking of the necessity for proper venting the speaker stated that many operators vent cores but do not provide an outlet through the mold for escape of core gases. In conclusion, he mentioned that many foundries have shown definite savings in expenditures by inspection of cores before they are set in molds, thereby eliminating the pouring of metal around cores which are not satisfactory and which may lead to scrap castings.

Oil City Brass Works Inc., Mabrey Foundry & Machine Co. and Standard Brass Co. entertained members and their guests with refreshments prior to the technical session.—*W. H. Lyne, Hughes Tool Co.*

Central Ohio

AT THE Jan. 26 meeting of the Central Ohio Chapter of the AFA, held at the Chittenden Hotel, Columbus, O., R. L. McIlvaine, National Engineering Co., Chicago, gave an interesting talk on "Foundry Mechanization."

Mr. McIlvaine showed pictures of before and after effects existing at the foundry of Moline Malleable Iron Co., St. Charles, Ill., to illustrate his discussion. Effect of newly installed and modern mechanical equipment was described and the speaker stressed the urgency of planning beforehand to insure installation of a

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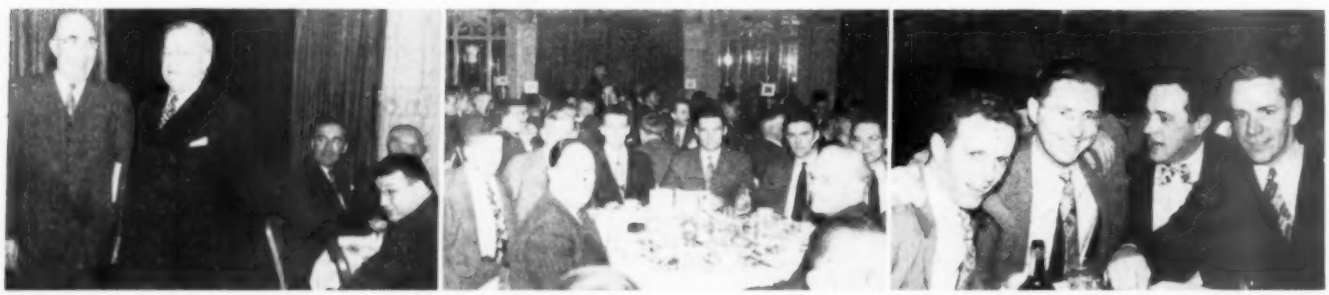

PITTSBURGH Foundrymen's Association held its annual Christmas Party at William Penn Hotel, Pittsburgh, Dec. 15. Day E. Cutler, J. S. McCormick Co., Pittsburgh, chairman, and other members of the entertainment committee planned an interesting evening for for more than 800 members and guests who attended

"take it" from Chief Keokuk...

60 30 12½

that's KEOKUK Electro-Silvery

Keokuk Electro-Silvery . . . 60 pound, 30 pound and 12½ pound . . . all are uniform in size and weight and all contain extremely accurate percentages of silicon, iron and alloys. Distinctively modern pigging machines, developed by Keokuk, provide this accuracy. Keokuk's special manufacturing process permits frequent metallurgical tests assuring thorough and constant control.

STEEL PLANTS

60-pound Keokuk Electro-Silvery Pigs for blocking the open hearth heat. For equal distribution of silicon and best temperature melt-down. Handle by magnet.

FOUNDRIES

30-pound Keokuk Electro-Silvery Pigs for charging mechanically or by hand into the cupola. Easily broken into two or more pieces, handled by magnet and measured by weight. Regular or alloy analysis.

12½-pound Keokuk Electro-Silvery Piglets so uniform in weight that they may be charged into the cupola by count, eliminating weighing operations. Handle by magnet. Regular or alloy analysis.

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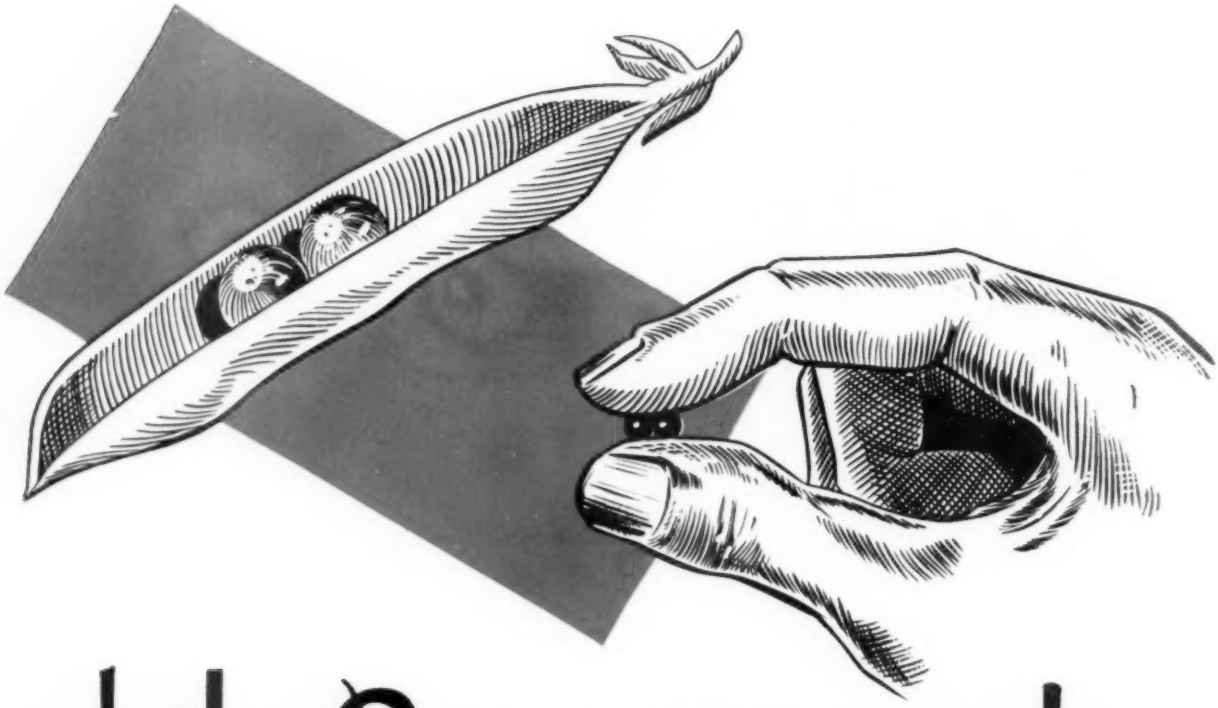

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ANNEALSHOT is annealed for toughness. It lasts at least 15% longer on the average. It is easier on your equipment. It costs no more than standard shot. Order a trial lot today and see for yourself. Or, we will gladly furnish a free sample so you can make a laboratory test. Write us today.

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PROLONGS THE LIFE OF YOUR EQUIPMENT

A SIZE FOR EVERY PURPOSE

COSTS NO MORE THAN ORDINARY SHOT

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(*Continued from page* 140)
correlated and efficient group of units. He stated that installation of new mechanical units from time to time may fail to give the desired results, even though each unit may be individually effective, if the overall picture is not given adequate consideration at the time of planning.

George Dreher, executive director of the Foundry Educational Foundation, Cleveland, discussed the activities of that group and emphasized the need for trained personnel in the foundry.—*H. W. Lownie Jr., Battelle Memorial Institute.*

Connecticut Non-Ferrous

NEW officers of the Connecticut Non-Ferrous Foundrymen's Association are: J. Joseph Shannon, Jenkins Bros Co., Bridgeport, Conn., president; George S. King, Malleable Iron Fittings Co., Branford, Conn., vice president; Owen Johnson, H. B. Ives Co., New Haven, Conn., treasurer; Charles A. H. Knapp, R. Lavin & Sons Inc., Clinton, Conn., technical secretary, and Louis G. Tarantino, Niagara Falls Smelting & Refining Division, New Haven, secretary.

Executive committee chairman is S. W. Chappell Sr., Electric Boat Co., Groton, Conn. Committee members are: Walter J. Kenney, New Britain, Conn.; D. Wesley Case, Belknap Mfg. Co., Bridgeport; T. Joseph Judge, Jenkins Bros. Co., and Howard A. Phelps, Knapp Foundry Co., Guilford, Conn.

On Dec. 17 at Hotel Taft, New Haven, the association held a round-table discussion concerning a diverter valve casting which showed periodic leakage and blows. Castings are made with 85-5-5-5 alloy, gated on ends with no risers, poured at 2180 to 2250°F with 3 oz phosphor copper per 100 lb added and cores are of No. 53 core sand.

After lengthy debate the following suggestions were offered as possible solutions: Change gating to get better metal flow and add risers; decrease metal wall thickness to eliminate waste of good skin metal; bake cores longer and increase their permeability.

It was suggested that these solutions be tried and reported back at the next meeting.—*Charles A. H. Knapp, R. Lavin & Sons Inc.*

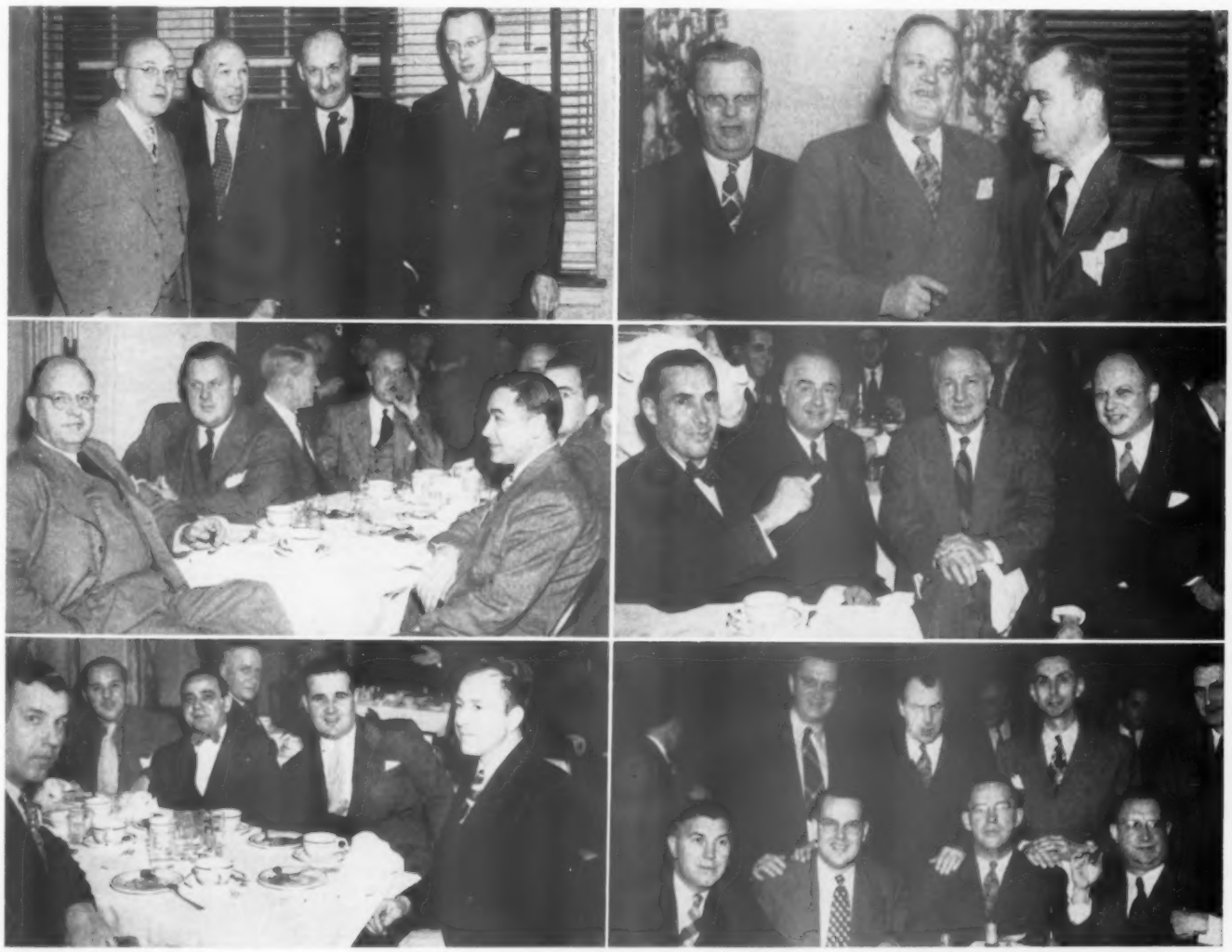
Tri State

FORTY-TWO members and guests attended the Jan. 16 meeting of Tri-State Chapter of the AFA at Hotel Mayo, Tulsa, Okla.

A. D. Brandt, Bethlehem Steel Co., Bethlehem, Pa., presented an interesting discussion on "Dust Control in the Foundry." He showed many slides to illustrate points in the talk. Dr. Brandt is the author of a recent book, "Industrial Health Engineering."

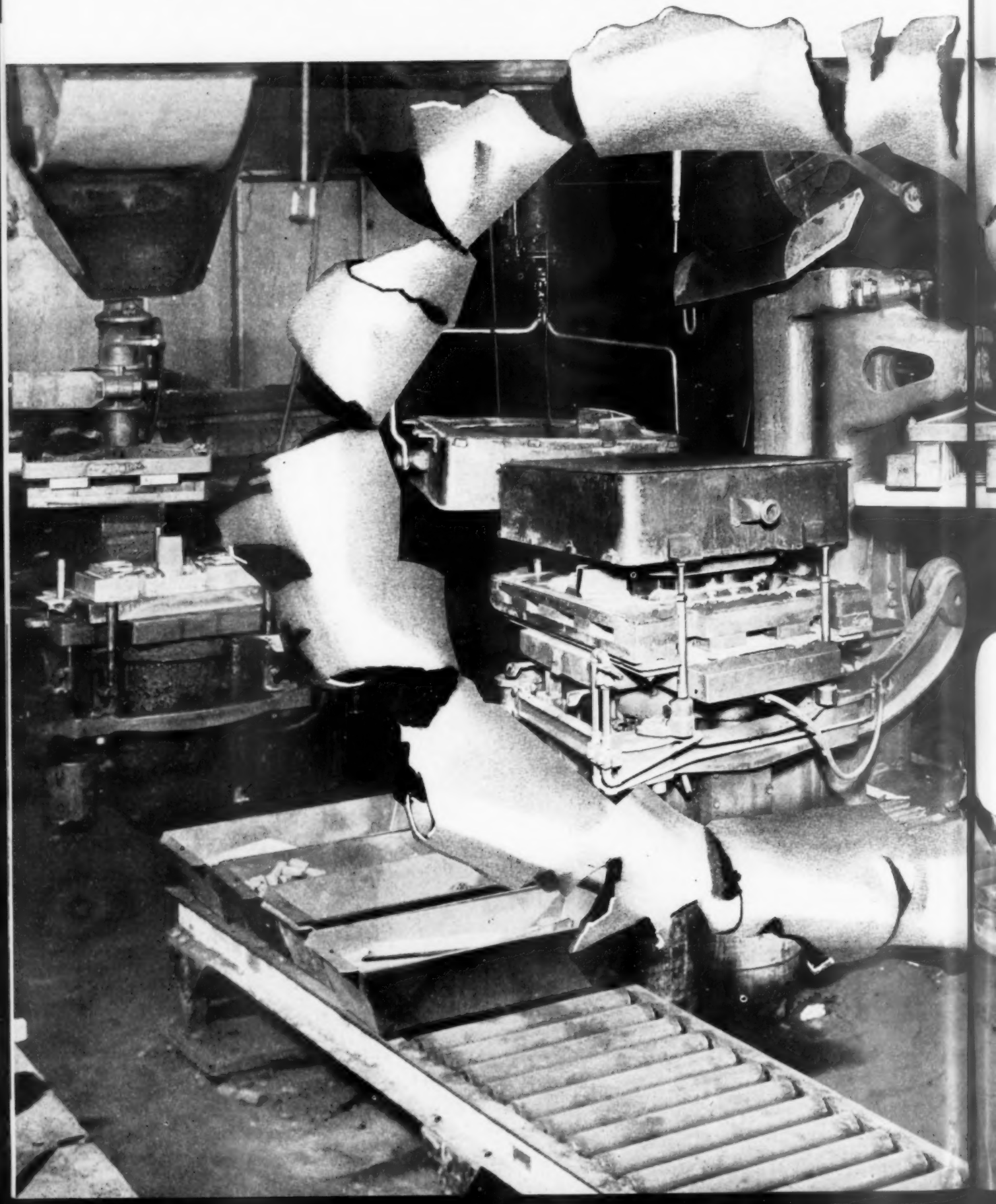
Chapter membership has reached 110. The chapter plans to hold a series of meetings outside Tulsa dur-

(*Continued on page* 146)



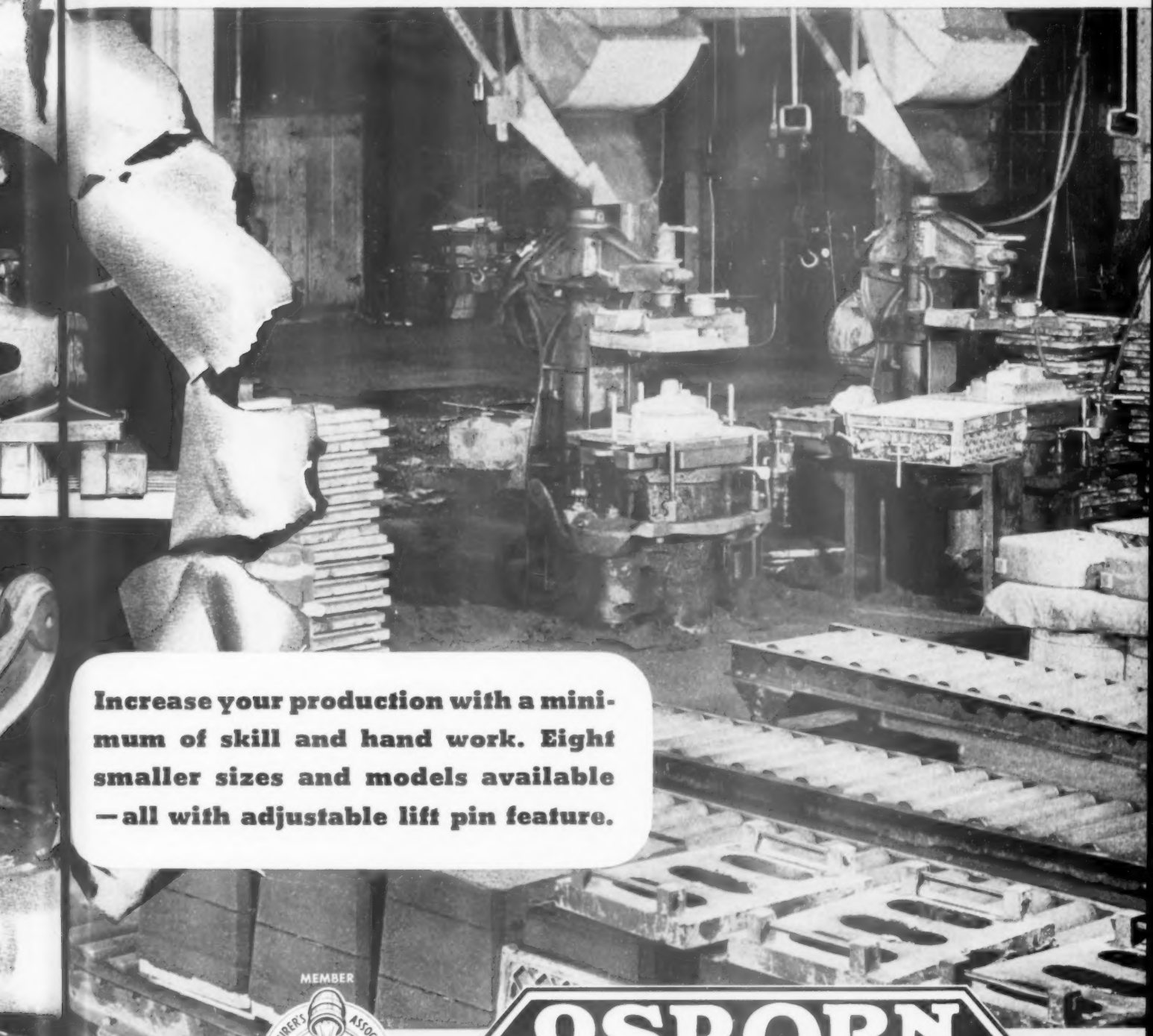
NO. ILLINOIS and SO. WISCONSIN: Views of the chapter's Christmas Party at Faust Hotel, Rockford, Ill., Dec. 13, are shown above. Photos by John Bing, A. P. Green Fire Brick Co.

HIGH PRODUCTION WITH FLEXIBILITY FOR PRODUCING LARGE SIZE MOULDS • • •



26" squeeze piston diameter

OSBORN jolt squeeze strip



Increase your production with a minimum of skill and hand work. Eight smaller sizes and models available —all with adjustable lift pin feature.

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MOULDING MACHINES

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5401 Hamilton Avenue — Cleveland, Ohio

DETROIT Chapter of the AFA held its annual Institutional and Old Timers' Night, Dec. 2. Top photo above shows, left to right: Fred J. Walls, International Nickel Co.; P. W. Mulder, Almont Mfg. Co., and James L. Mahon, American Car & Foundry Co. Lower view shows part of the group harmonizing some of the old songs. Photos by Vaughan C. Reid, City Pattern Foundry & Machine Co.

(*Continued from page* 143)
ing the year for the purpose of creating interest in chapter activities with the hope of increasing membership. The Mar. 19 and Apr. 14 meetings will be held in Tulsa.—*R. W. Trimble, Bethlehem Supply Co.*

Detroit

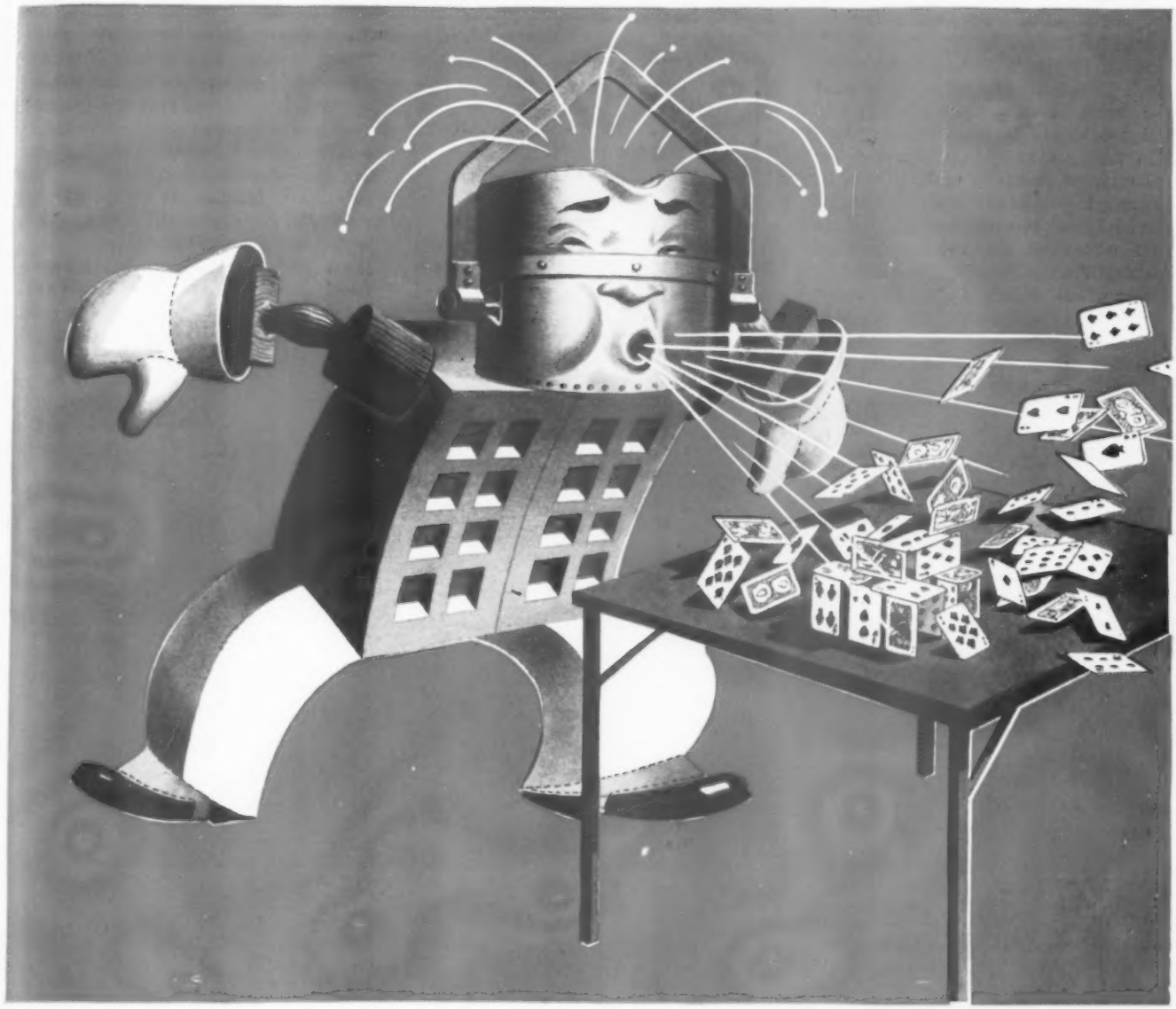
DETROIT Chapter of the AFA held individual technical sessions at its meeting in Rackham Memorial Jan. 15.

At the gray iron session, F. W. Walls, International Nickel Co., spoke on gray iron carbon control in the cupola under present conditions, and the application of cupola formulas and modifications necessary to get higher carbon and carbon control. Discussion leader was J. E. Coon, foundry metallurgist, Packard Motor Car Co.

The pattern group heard E. J. Kindt, Kindt-Collins Co., Cleveland, speak on "Facts and Theory of the Pattern Industry." Along with his talk a motion picture was shown on the production of items used in the pattern construction, the use of wood and metal work machinery in producing foundry tools, and the production of cast aluminum matchplates in plaster. E. J. Rousseau, Commerce Pattern Foundry & Machine Co., was

(*Continued on page* 148)

TRI-STATE: Present at the Jan. 16 meeting of Tri-State Chapter of the AFA were, front row, left to right: A. D. Brandt, Bethlehem Steel Co., Bethlehem, Pa., speaker; R. W. Trimble, Bethlehem Supply Co., Tulsa, Okla., chapter chairman; C. H. Bentley, Webb Corp., Webb City, Mo., chapter director; and Dale Hall, Oklahoma Steel Castings Co., Tulsa, chapter vice chairman. Back row, left to right: Clyde B. Fisher, Enardo Mfg. Co. Tulsa, chapter secretary; Fred E. Fogg, Acme Foundry & Machine Co., Coffeyville, Kans., chapter director; M. C. Hellander, Empire Pattern & Foundry Co., Tulsa, chapter director; B. P. Glover, M. A. Bell Co., St. Louis, chapter director, and Frank G. Lister, Chicago Pneumatic Tool Co., Tulsa, chapter treasurer. Photos by J. F. Eaton, Bethlehem Supply Co.



Burned-out cores that collapse like a house of cards

Krause Cereal Binders—TRUSCOR (light weight) and AMERIKOR (heavy weight) contribute green strength to the core before baking, dry strength to the core after baking, and collapsibility to the core after casting.

Both cereal binders develop a strong affinity between the sand granuals — guaranteeing excellent green strength — while at the same time permitting the sand mix to flow freely and quickly into the smallest and most remote part of the core box or pattern.

Then when a Krause cereal binder core is placed in the mold and the casting is being poured — this same cereal binder burns out rapidly and completely, insuring ready collapsibility and easy shake out.

So why not take advantage of all these benefits by placing your next order for cereal binder with one of the distributors listed below, or with us direct.

CHAS. A. KRAUSE MILLING CO., MILWAUKEE 1, WIS.
World's Largest Millers of Dry Corn

Truscor AND **Amerikor**
(Light Weight) (Heavy Weight)

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Independent Foundry Supply Co., Los Angeles 11, Calif.
Joseph B. Meier, 96 N. 18th St., East Orange, N. J.
Marthens & Co., Moline, Ill.
Carl F. Miller & Co. Seattle 4, Wash.
Milwaukee Chaplet & Mfg. Co., Milwaukee 4, Wis.
Pacific Graphite Works Oakland 8, Calif.
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Smith-Sharpe Co. Minneapolis 14, Minn.
Frederic B. Stevens, Inc. Buffalo 12, N. Y.
Frederic B. Stevens, Inc. Cleveland 14, Ohio
Frederic B. Stevens, Inc. Detroit 26, Mich.
Western Industrial Supply Co. 208 S. E. Hawthorne Blvd. Portland 14, Oregon

(*Continued from page* 146)
discussion leader.

H. J. Williams, New Jersey Silica Sand Co., Millville, N. J., addressed the sand session on "Mining and Preparation of Molding Sands." Motion pictures and slides showed the behavior of sands in molding and illustrated proper foundry technique for obtaining composition and texture that will meet the requirements of moldability, strength, permeability and surface finish. F. S. Brewster, Harry W. Dietert Co., Detroit, was discussion leader.

Coffee speaker was Lt. Col. William C. Baldwin, assistant prosecutor, U. S. Army, at the trials in Nuremberg, Germany. He explained to the 250 men present the manner in which the trials were held and how they were grouped.—*C. J. Rittinger, American Car & Foundry Co.*

Northeastern Ohio

FRED G. SEFING, International Nickel Co. Inc., New York, addressed 224 members and guests of Northeastern Ohio Chapter of the AFA at the Cleveland Club, Cleveland, Jan. 8 on "Casting Soundness as Affected by Gating, Risering and Gas Porosity."

Mr. Sefing stated that the one underlying principle that holds true for producing sound castings from all metals is controlled progressive solidification. The gating, risering and pouring of castings should be done in such a manner as to fulfill that principle. He added that it is a known fact that the thinnest casting sections and the coldest metal freeze first. These facts should be considered when gating and risering castings. According to Mr. Sefing, the

(*Continued on page* 150)

NORTHEASTERN OHIO Chapter of the AFA held its thirteenth annual Christmas party, Dec. 11, at Carter Hotel, Cleveland. The party, under the direction of L. P. Robinson, Werner G. Smith Co., Cleveland, drew 1000 members and guests who enjoyed the turkey dinner and two-hour floor show. Photos courtesy Sterling Farmer, Sand Products Corp.

Pour on the heat . . . this belt is made with glass!

New Hewitt Glass Fiber Conveyor Belting Carries Materials Heated to More Than 350° F.

You're looking at the hottest thing in conveyor belting.

It's new Hewitt *Glass Fiber*-reinforced Conveyor Belting. And it handles the toughest, hottest materials without batting an eye!

It does so because nearly ten years of research by Hewitt engineers stand behind it. Hewitt engineers developed a method of making heat-resisting glass fibers adhere to long-lasting friction rubber . . . the way a duck-ply carcass sticks to the rubber cover of a conventional conveyor belt.

You see, glass fibers will not weaken and pull apart under continuous, extreme heat. They hold the heat-resisting rubber cover firm . . . will not let the belt soften, stretch, or slip.

The result is a belting that will stand up to torturous punishment meted out by hot sand and other materials having temperatures up to 350° F . . . *and higher.*

Before new Hewitt Glass Fiber Belting was introduced, it was put on the roughest, toughest foundry hauling jobs imaginable. It was subjected to months of searing heat.

Its specially compounded rubber cover exceeded all expectations. And its glass fiber carcass *proved it could take it when you pour on the heat!*

This development adds still another illustrious name to the long list of products developed by Hewitt. Other products include transmission and elevator belting, sand-blast, air drill, and welding hose.

No matter what *your* materials-handling problem, find out how Hewitt engineers can solve it for you. For more complete information, phone the Hewitt distributor listed in the yellow pages of your phone book. Or write Hewitt Rubber Division, 240 Kensington Avenue, Buffalo 5, New York.

HEWITT RUBBER DIVISION

HEWITT-ROBINS INCORPORATED

HEWITT glass fiber CONVEYOR BELTING

Hewitt-Robins Incorporated—Industrial Hose • Belting • Packing

CHICAGO: Seated at the speakers' table at the Jan. 5 meeting of Chicago Chapter of the AFA are, left to right: Guest Speaker E. Claude Jeter, assistant to the manager of foundries, Ford Motor Co.; Technical Chairman A. W. Gregg, Whiting Corp., Harvey, Ill.; Chapter President Fred B. Skeates, Link-Belt Co., Chicago, and Past President L. H. Hahn, Sivyer Steel Casting Co., Chicago. Photo courtesy George J. Biddle, Illinois Clay Products Co.

(*Continued from page* 148)

same principles of gating and risering apply in all metals—it is only the degree that differs.

Risers feed castings only when the metal is at freezing temperature and usually are only 20 per cent efficient and seldom as much as 40 per cent efficient. Insulation and the use of exothermic topping compounds, however, have made some risers 90 per cent efficient.

With respect to pouring, the speaker advocated fast and quiet pouring by using many thin, wide gates to get metal into the mold quickly and with little washing effect. Slow pouring, he went on to say, is the same as pouring cold-metal regardless of the metal temperature.

Mr. Sefing showed a number of slides as he talked, to illustrate his statements.

H. G. Dyktor, commissioner, Division of Air pollution Control, Cleveland, gave a short coffee talk, advising foundrymen to curtail their contribution to Cleveland's air pollution and describing some of the work of his committee in enforcing the laws regulating air pollution.—*Robert H. Herrmann.*

METROPOLITAN Chapter of the AFA held a Christmas party at Essex House, Newark, N. J., Dec. 12, with about 450 attending. Retiring Chapter Chairman H. L. Ullrich, Sachs-Barlow Foundries Inc., Newark, was presented with an engraved pen and pencil set. Photos by D. S. Yeomans, George F. Pettinos Inc.

Metropolitan

MELTING of ferrous and nonferrous metals was discussed at four round-table sessions at the regular monthly meeting of the Metropolitan Chapter of the AFA at Essex House, Newark, N. J., Feb. 2. Approximately 90 members and guests were present.

A. E. Winstead, Moore Bros. Co., Elizabeth, N. J., presided at the session on gray iron castings; H. E. Cragin, Taylor-Wharton Iron & Steel Co., Wharton, N. J., on steel; John A. Bukowski, Worthington Pump & Machinery Corp., Harrison, N. J., on copper-base castings; and A. Cristello, Eclipse Pioneer Foundries, Teterboro, N. J., on aluminum and magnesium.

Kenneth A. DeLong, International Nickel Co., New York, chapter chairman, announced a new nominating committee, comprised of Harold L. Ullrich, Sacks-Barlow Foundries Inc., Newark, chairman; Horace Deane, American Brake Shoe Co., New York; and Fred G. Sefing, International Nickel Co., New York. A report will be submitted at the next meeting.

F. L. Weaver, Weaver Materiels Services, Buffalo, secretary, Western New York Chapter, was an honored guest at the meeting.—*B. K. Price.*

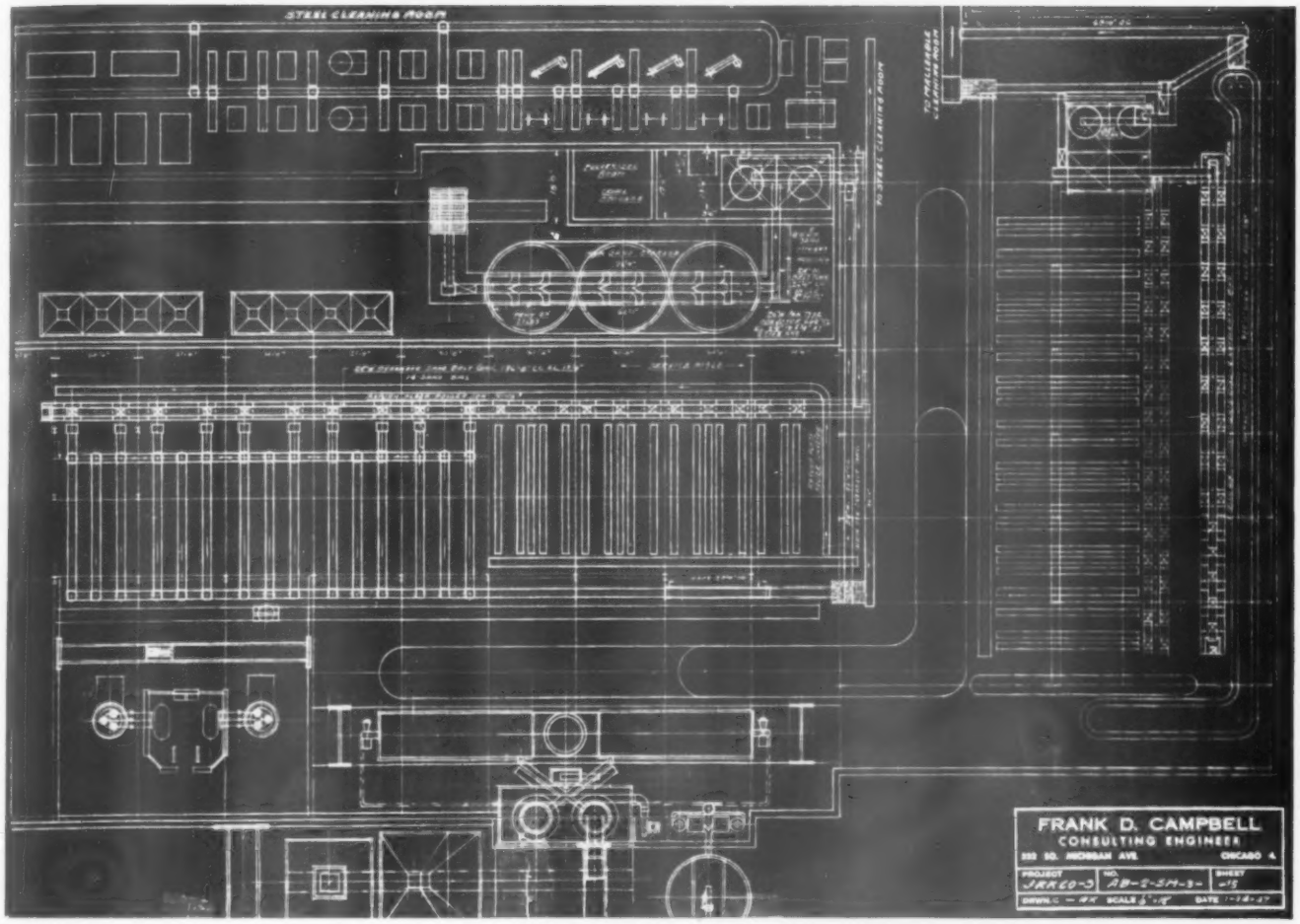
Chicago

FOR its regular monthly meeting on Feb. 2 at the Chicago Bar Association, the Chicago Chapter of the AFA, conducted three round-table sessions. This was the third meeting of this type for the current season, and with an attendance of 250 members and guests struck the high point of the series. Only the National Officers' Night program in November attracted an equal turnout.

Chapter President Fred B. Skeates presided over the general portion of the program, and Chapter Vice President and Program Committee Chairman Chester K. Faunt introduced the speakers and chairmen for the group meetings.

The Steel and Pattern divisions joined forces in one round-table on "Application of Plastic Patterns in

(*Continued on page* 152)



an example of compactness in mechanical handling to secure maximum production of floor area.

FOR EACH **TON** OF CASTINGS PRODUCED YOU WILL MOVE **100 TONS** OR MORE OF CUMULATIVE MASS WEIGHT OF PRODUCTS AND MATERIALS IN REPETITIOUS HANDLING

It takes 10 MEN to equal the work of a single ONE HORSE power motor in an 8 hour period, and while mechanical power cannot replace all men it can do the otherwise most expensive and least desirable work in casting manufacture. Hence the hard physical part of FOUNDRY production is the point of attack to achieve conditions, satisfying to both workers and management.

Your NET SALES DOLLAR is a DOLLAR of competitive effort and from somewhere in this inelastic DOLLAR you must squeeze the required higher wages and desirable profits.

We can bring certain ENGINEERING skills to bear on your problems—plans and procedures to serve your individual needs. We invite the inquiries of interested management.

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Specialists in the Engineered Application
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(*Continued from page* 150)

the Steel Foundry," with Ladd Salach, president, Plastic Corp. of Chicago, as the speaker. Waldo Hikes, sales manager of the same company, served as chairman.

Fred L. Bender, chief inspector, Chicago Hardware Foundry Co., North Chicago, Ill., addressed the Nonferrous round-table on the subject of "Nonferrous Casting Inspection Procedure." Officiating as chairman was Martin G. Dietl, nonferrous metallurgist, Crane Co., Chicago.

In the third round-table, the Gray Iron and Malleable divisions combined to hear B. P. Mulcahy, consultant in cupola operation and coal carbonization, Indianapolis, discuss "Cupola Operation." Chairman of this session was Leonard A. Colangelo, foundry metallurgist, Tractor Works, International Harvester Co., Chicago.

(*Continued on page* 156)

NEW ENGLAND: Annual meeting of the New England Foundrymen's Association was held Jan. 14 at the Parker House, Boston. Those present enjoyed dinner and a program of entertainment. The only business of the meeting was the election of officers and committee members for 1948. Photos courtesy of C. A. Wyatt, Debevoise-Anderson Co. Inc.

Saved by 5 pounds of NI-ROD...

Cast iron cylinder for a hydraulic sewer pipe press, measuring 68 inches long, 30 inches in diameter, with a bore of 20½ inches. Ni-Rod was used to weld plugs into unwanted stud holes, and fill a mislocated oil groove.

Here is a case where a small dose of Ni-Rod* cured a large technical headache.

When it was discovered that a relatively slight machining error had ruined an expensive 2500 pound casting, technicians of a West Coast machine company were dismayed.

The casting was to be used in a hydraulic press for forming sewer pipes. The mere matter of a mislocated oil groove—measuring only 7 inches long, 2 inches wide, and 1 inch deep—had rendered the cylinder useless for its intended purpose.

Remedies of all kinds were suggested but were regretfully discarded as impractical. When hope of saving the casting by ordinary means had faded, specialists of the Pacific Metals Company, Ltd., Los Angeles, were called in. They were immediately optimistic. They suggested welding with Ni-Rod.

Work was started at once. Welders carefully filled the misplaced oil groove with Ni-Rod. At the same time, still another alteration was attempted. 12 unwanted stud holes were blocked up by welding in cast iron plugs.

When the final remachining was complete, it proved almost impossible to tell where the welding had been done. The repair was successful in every respect, and spirits soared at the machine company's plant. With 5 pounds of Ni-Rod, costing only $7.50, they had saved a 2500 pound casting that had cost $1,000!

Reports such as this—reports of Ni-Rod's superior performance—are coming in from all parts of the nation. Shops everywhere are turning to Ni-Rod for better welds in cast iron, and dependable welds of cast iron to steel. If welding plays a part in your production or maintenance operations, find out more about Ni-Rod without delay. Send for your copy of "For Machinable Welds in Cast Iron."

*Reg. U. S. Pat. Off.

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Wilkinson Company, Ltd. — Metal & Thermit Corporation
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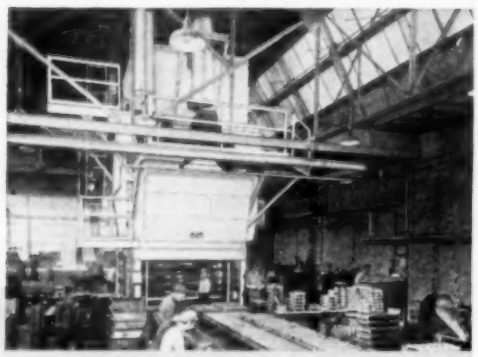
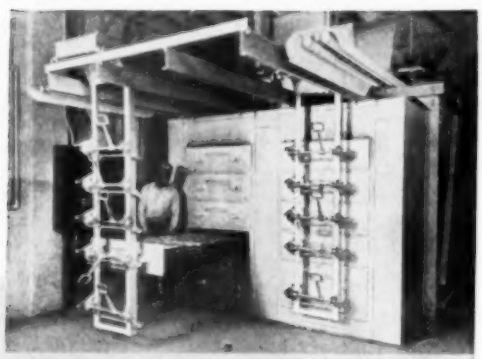
THERE ARE MANY OTHER TYPES OF COLEMAN OVENS SUITED TO THE CORE BAKING AND MOLD DRYING REQUIREMENTS EXISTING IN YOUR OWN FOUNDRY



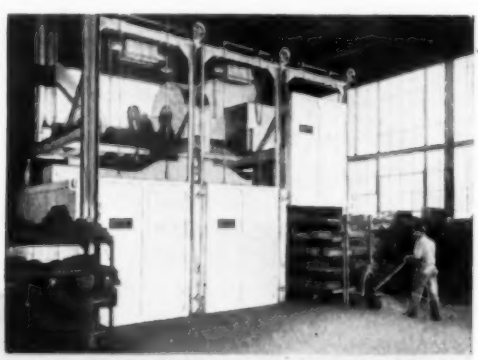
★ **COLEMAN TOWER OVENS**

For high speed production at lowest cost. Patented Open Center permits loading from inside and out, providing maximum labor saving.



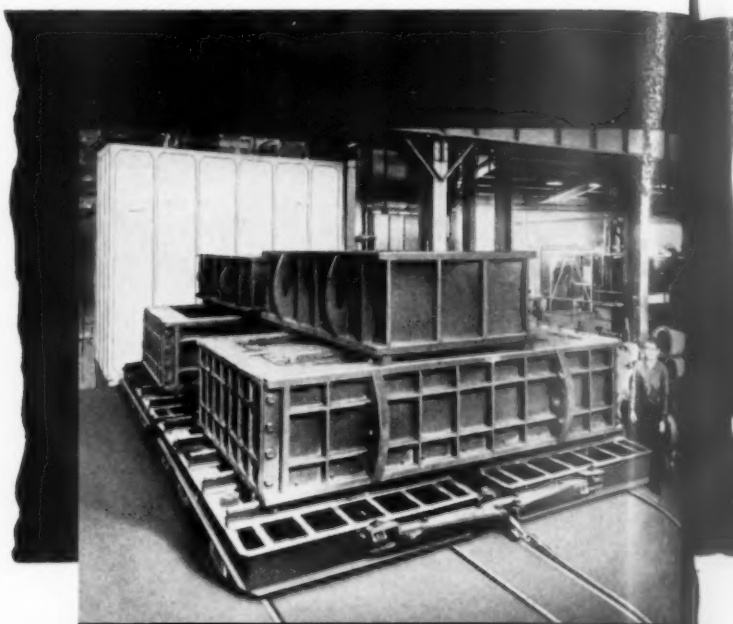
★ **COLEMAN ROLLING DRAWER OVENS**

For small and medium cores. High-speed production with limited floor space.



★ **COLEMAN TRANSRACK OVENS**

For use with portable racks to reduce handling labor. Very efficient where ample floor space is available.



A FEW REPRESENTATIVE OWNERS OF COLEMAN CAR-TYPE OVENS

Ingersoll Rand Co.	Farrel-Birmingham Co.
Worthington Pump & Machy. Co.	United Engine & Foundry Co.
Chicago Pneumatic Tool Co.	Continental Fdry. & Mach. Co.
Allis Chalmers Manufacturing Co.	Bullard Co.
Clark Bros. Co., Inc.	E. W. Bliss Co.
Fairbanks, Morse & Co.	Cincinnati Milling Machine Co.
National Supply Co.	General Electric Co.
Nordberg Manufacturing Co.	Westinghouse Electric Corp.
DeLaval Steam Turbine Co.	Bethlehem Steel Co.
American Locomotive Co.	Carnegie-Illinois Steel Corp.
Baldwin Locomotive Works	American Rolling Mill Co.
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Falk Corporation	American Manganese Steel Div.

COLEMAN HEATING SYSTEMS USE THE MOST ECONOMICAL FUEL AVAILABLE TO YOU: GAS, OIL, STOKER-COAL, ELECTRICITY, ETC.

The FOUNDRY EQUIPMENT CO

CLEVELAND 13, OHIO, U. S. A.

WORLD'S OLDEST AND LARGEST FOUNDRY OVEN SPECIALISTS

COLEMAN
CAR-TYPE OVENS
"ELIMINATE ALL DRYING VARIABLES"

writes J. D. JAMES—The Cooper-Bessemer Corp.

"Our Coleman Ovens have seen a lot of heavy service and are doing a remarkably fine job in every way. These ovens have completely eliminated all former baking and drying variables. In ridding ourselves of these uncertainties we have not lost a single Diesel Cylinder Head casting due to drying.

We no longer have such a condition as the scrapping of molds on account of over-drying, nor find it necessary to re-heat any molds because of imperfect drying. This part of our operation used to cause us plenty of headaches.

The savings from our shortened drying cycles, absolute uniformity in mold drying, and elimination of mold and casting scrappage have long since returned our investment in Coleman Ovens."

Throughout the foundry industry, wherever large cores and dry sand molds are handled, Coleman Car-Type Ovens are the acknowledged leaders in dependable performance and low-cost operation. Here's why:

COLEMAN CONTROLLED HEATING SYSTEMS produce perfectly baked cores and correctly dried molds. The elimination of all baking and drying variables means reliable, uniform results in place of guess-work and uncertainty—reduces mold and casting scrappage.

COLEMAN HEAVY DUTY CONSTRUCTION is responsible for dependable performance, economical operation and low maintenance cost under rugged service requirements.

COLEMAN KNOW-HOW has been gained through specialization in the field of foundry ovens. Coleman Oven Engineers have been designing and building foundry ovens for over 40 years.

Most of the large core and mold ovens used by well-known foundries in every class of heavy casting production are Coleman Car-Type Ovens. The outstanding quality of Coleman Ovens is shown by their widespread use by such concerns as those listed to the left.

WRITE TODAY FOR FOLIO OF BULLETINS

COLEMAN CAR-TYPE OVENS ARE AVAILABLE IN A WIDE RANGE OF SIZES AND CAPACITIES FOR VARIOUS PRODUCTION NEEDS, ASSURING DEPENDABLE PERFORMANCE AT LOWEST POSSIBLE COST

COMPANY

BUILDERS OF COLEMAN AND SWARTWOUT OVENS

MEMBER MANUFACTURERS' ASSOCIATION INC. FOUNDRY EQUIPMENT

COLEMAN
CORE AND MOLD OVENS

OVER 9000 SUCCESSFUL INSTALLATIONS

(*Continued from page* 152)

Mr. Mulcahy opened his comprehensive remarks by stating that the cupola is one of the best melting units devised by man, also one of the most abused. Currently, a problem of major importance is that of inferior coke quality, brought about by short supply. The situation varies from district to district, but basic factors affecting coke quality are inferior coal and the short coking cycle employed to obtain higher oven output. Cupola operation also suffers at the present time from the acute shortage of pig iron and the necessity for increasing the use of scrap in melts.

It was made clear by Mr. Mulcahy that poor coke quality, however, is not responsible for all cupola difficulties and stated the raw materials situation is not going to get easier any too fast. Among other items which he covered were materials to increase carbon solubility, auxiliary fuels, and the like.

Next regular chapter meeting will be a general one on Mar. 1 with L. P. Robinson, director of core oil sales, Werner G. Smith Co., Cleveland, as the speaker. His subject will be "Core Oils."

The Chicago Chapter held its annual Ladies' Night party on Jan. 10 with a dinner, floor show and dancing at the Palmer House. Attendance was approximately 500.

The chapter will participate in the Technical Conference to be held at the Stevens Hotel, Mar. 22-24, in conjunction with the Chicago Production Show sponsored by the Chicago Technical Societies Council, of which the chapter is a member. Being arranged are four technical sessions to be held on March 24. The sessions of the Gray Iron and Nonferrous divisions are scheduled for 10 to 12 a.m., and those of the Steel and Malleable divisions for 2 to 4 p.m.—*Erle F. Ross.*

FLOOD LAMPS ILLUMINATE

Large Shot Blasting Room

By N. B. BURROUGHS
Electrical Engineer
Erie Works, General Electric Co.
Erie, Pa.

HOW to light industrial shot blasting operations without demolishing the lighting equipment has been a problem for a long time. Obviously, standard industrial reflectors would be damaged quickly by the work, and blast practice usually has been to use standard filament lamps in heavy glass enclosing globes. This reduced breakage and lamp life was extended, but the solution was not wholly satisfactory.

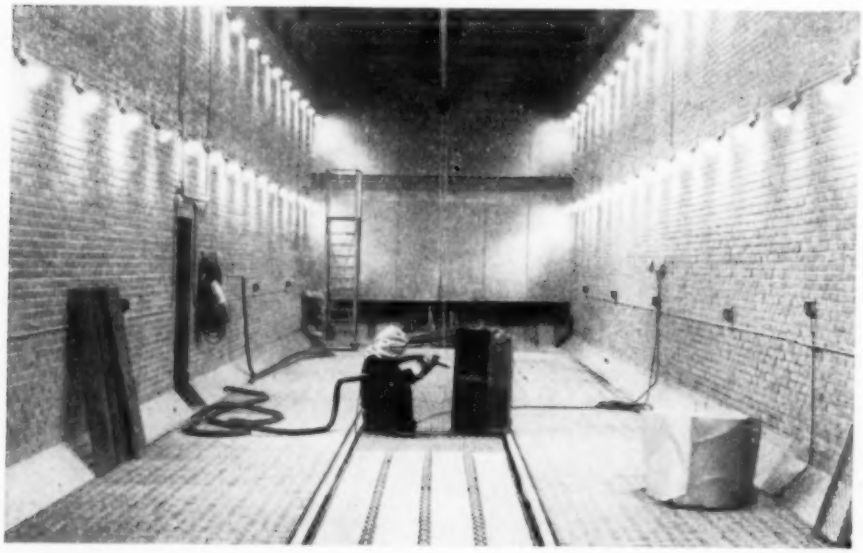
Erie Works of the General Electric Co. believes it has found the answer in a 150-watt flood lamp which has its own reflector built into the inner surface of the heavy heat-resistant envelope. The lamps have delivered normal light for normal life under the unusual conditions of shot blasting.

At that plant a separate building was constructed for shot blasting work on electric locomotives. This required a lighting system proportioned to the size of the operations. The completed lighting installation using 150-watt flood lamps is shown in the illustration.

In a building 87 ft long, 18 ft wide and 20 ft high, the lamps have been located on the walls at two levels above the working floor. The higher level, was installed at 16 ft above the floor and the lower at 10 ft. The 68 lamps required for the installation are spaced 5 feet apart, 17 in each row on each side. They are mounted to direct the illumination downward at an angle of 45 degrees, and it has been found that accumulation of dirt on the face of the lamp in this position is slight. Illumination for approximately 30 footcandles is provided on the work.

The system described has been in operation for more than a year with satisfactory results. Work in the shot blasting room is carried on 50 hours a week and lighting is required for every unit of it. Lamp replacements are made on the average of 25 per cent per month, but not for failures due to shattering. Lamps that are replaced are those that have burned out at normal life.

When the installation was made, caution was observed in locating all the wiring and load centers outside the blast area. Sockets are supplied with 1/4-in. felt gaskets to keep shot from entering the socket shells.



Eastern New York

THE first regular meeting of the recently organized Eastern New York Chapter of the AFA was held at the Circle Inn, Latham's Corners, on the outskirts of Albany, N. Y., Dec. 16. A preliminary meeting of the foundrymen in the area including eastern New York, Vermont and western Massachusetts was held in September and the organization meeting was held in October. The new chapter is the 39th in order of admission and fifth in the Empire State. Others are Metropolitan, Rochester, Central New York and Western New York.

Officers of the new chapter include Charles E. Killmer, Albany representative of the Swan-Finch Oil Co., chairman; Alexander Andrew, foreman, American Locomotive Co., Schenectady, N. Y., vice chairman; John A. Wettergreen, assistant foundry superintendent, General Electric Co., Schenectady, N. Y., secretary-treasurer.

At the December meeting the subject of gates and risers was discussed by Pat Dwyer, engineering editor, THE FOUNDRY. The plain, practical talk on the variety of gates, with typical illustrations of their function and application to a wide range of castings was illuminated with touches of the wit and humor which characterize his writing and with which

(*Continued on page* 158)

Good News!

4 MACHINES IN ONE.....

this New JOLT SQUEEZER by ARCADE

- portable or stationary—simply remove the wheels and bolt it down, or vice versa.
- 10-inch or 12-inch cylinder—easily convertible from either one to the other.
- designed to produce the maximum number of molds with least manual effort.
- steel arm, steel back frame, steel base—a rugged machine built to stand up under continuous hard use and establish new records for low-cost operation.
- a minimum number of parts means low maintenance.

Every molder who has used this machine prefers it to any he has ever used. It will win that same favor in the office—with the men who demand production and the men who scrutinize costs.

For full specifications, write us.

Look for further important developments at Arcade

ARCADE

MANUFACTURING DIVISION

ROCKWELL MANUFACTURING COMPANY

FREEPORT, ILLINOIS

(*Continued from page* 156)

readers of THE FOUNDRY have been familiar for many years. Interest in the program is indicated by the fact that the discussion after the formal presentation was prolonged for half an hour after the announced closing time.—*Charles E. Killmer Jr., Swan-Finch Oil Corp.*

Birmingham

OVER 125 members and guests of Birmingham District Chapter of the AFA heard B. P. Mulcahy, consultant on cupola operation and coke, Indianapolis, speak on "Foundry Coke and Cupola Operation" Jan. 16 at Tutwiler Hotel, Birmingham.

His talk, illustrated with slides, was very effective and drew much interested discussion from the audience.

Prof. E. C. Wright, University of Alabama School of Metallurgy, was the coffee speaker. He suggested ways of interesting college students in a foundry practice course.

He said that high school students and foundry workers' sons should be encouraged to study foundry work in college. Company laboratory equipment considered obsolete could be used for college training purposes. Company co-operation in submitting practical foundry or metallurgical problems on which students could work and possibly prepare their theses would be an instructional aid. Lastly, Professor Wright stated that student interest and value to the industry could be increased by employing students in foundries during the summer.—*J. P. McClendon, Stockham Pipe Fittings Co.*

Reading

REGULAR monthly meeting of Reading Foundrymen's Association was held in the Walnut Room, Berkshire Hotel, Reading, Pa., Jan. 20. Arthur N. Kugler, Air Reduction Sales Co., New York, spoke on the history of welding from its inception up to the present modern techniques.

Recently elected association officers are: Werner Finster, president; Paul Harner, vice president; James S. Hinkley, treasurer and William I. Cassidy, secretary. Committee chairmen are: Herman E. Mandel, program; Rex Harrison, membership, and Herman P. Good and Leonard Bilger, entertainment.

Retiring president, Bruce Edris, was presented with a desk set as a token of appreciation of his work as president.—*William I. Cassidy.*

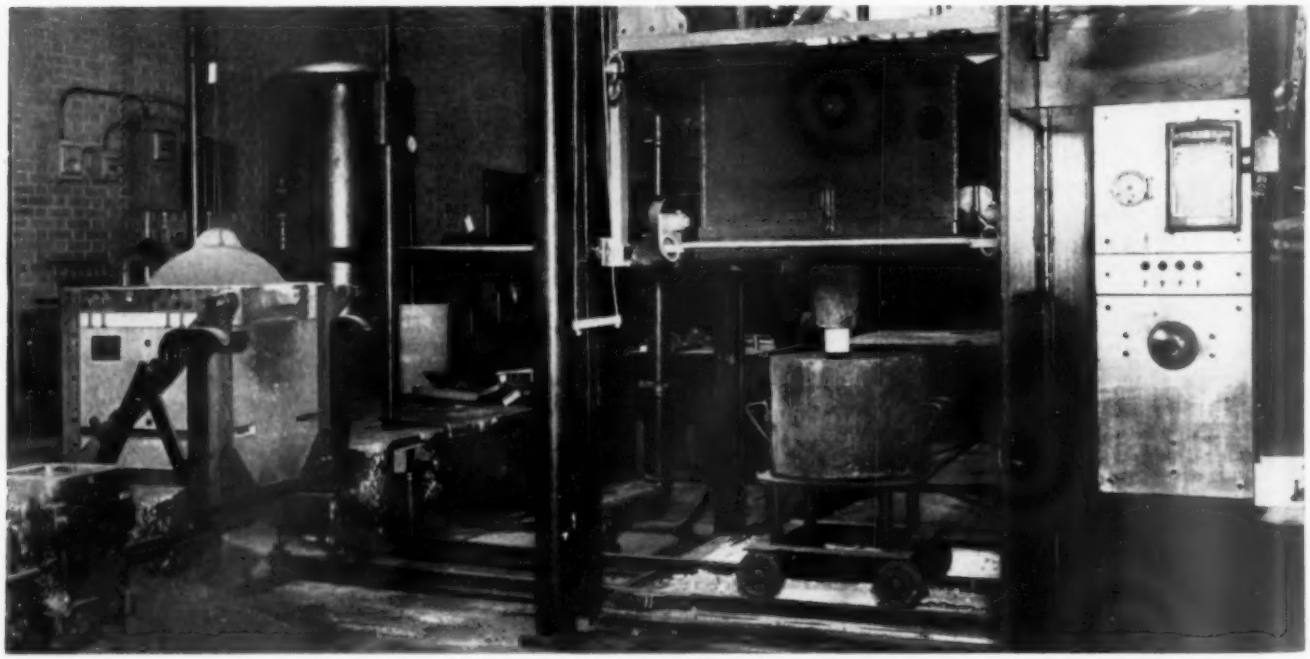
New England

ELECTION of officers, a dinner and entertainment comprised the program for the annual meeting of the New England Foundrymen's Association at the Parker House, Boston, Jan. 14. New officers are: Arthur F. Dockry, H & B American Machine Co., Pawtucket, R. I., president; Frederick M. Fitzgerald, Draper Corp., Hopedale, Mass., vice president; Arthur W. Gibby, East Boston, Mass., treasurer, and Ernest F. Stockwell, Barbour-Stockwell Co., Cambridge, Mass., secretary.

On the executive committee are:

(*Concluded on page* 160)

NEW CASTING MACHINE IS DEVELOPED



COUNTER-GRAVITY casting is a relatively new development in the foundry industry. The process is based on controlled vacuum pouring—sucking of metal from a special holding ladle placed beneath the mold and connected to it by an inverted gate or spout.

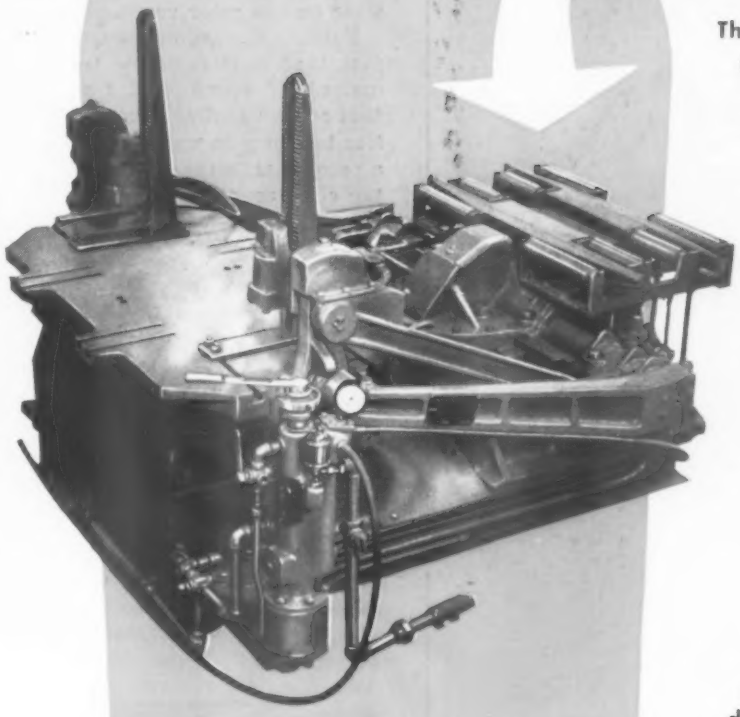
A number of economic advantages arising from improved yields are claimed. In addition, instrument control of molten metal pouring eliminates one of the most prevalent sources of defects in casting. The process also offers a means of eliminating slag and avoids the violent agitation of metal inherent in some types of casting processes currently in use.

The use of vacuum in melting and casting is not new; laboratory installations for preparation of high purity metals and alloys have been used for years. These usually employed a sealed chamber containing both melting unit and mold with remote controlled pouring. German developments during the war applied units similar to those used in laboratories in this country to the commercial production of castings of high purity metals, stainless and heat-resistant alloys.

Shown above is a counter-gravity casting machine developed by Armour Research Foundation, Chicago, for Wetherill Engineering Co., Philadelphia. At right is the control station, and next to it, on the left, is the vacuum box which covers the mold. Suction gate can be seen below the box.

THIS FOUNDRY IS A GOOD PLACE TO WORK

CINCINNATI MILLING MACHINE CO.



This Ohio foundry, world's largest producer of machine tool castings, can amply justify its reputation as a good place to work. The entire foundry has been laid out with maximum efficiency in mind. Particular emphasis is placed on eliminating unnecessary hand operations. It is highly conveyorized. Raw materials, metal temperatures, and characteristics of the metal itself are closely checked, tested, and controlled.

The use of Herman Molding Machines (8 at the present time) contributes greatly to making this foundry a good place to work. Production increases up to 500% are an actual fact, as a result of these machines. The 1500-lb. machine illustrated is simple to operate. The timer controls jarring. One valve handles all operations. A nearby Herman sales engineer will gladly provide additional details. Contact us today at address below.

MEMBER

HERMAN MOLDING MACHINES

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH, PENN.

(*Concluded from page* 158)

Frederick M. Fitzgerald, Draper Corp., Hopedale, Mass., chairman; Thomas I. Curtin, Waltham Foundry Co., Waltham, Mass.; Robert C. Walker, Whitin Machine Co., Whitinsville, Mass.; Frank R. Elliot, Westinghouse Electric Corp., Springfield, Mass.; Joseph B. Stazinski, General Electric Co., Lynn, Mass., and Charles A. Reed, Cambridge. — *Merton A. Hosmer, Hunt-Spiller Mfg. Corp.*

Michiana

MICHIANA Chapter of the AFA met Jan. 6 at South Bend, Ind., to hear B. J. Mulcahy, consulting engineer of Indianapolis, who spoke on "Cupola Operation."

Because of the critical shortages of pig iron and coke in the gray iron industry, Mr. Mulcahy analyzed prevailing conditions and their effect upon present day operations.

Presenting analysis of current coke, Mr. Mulcahy informed his audience of the deficiencies in coke as compared to the prewar product. Further, he explained correct practices in cupola operation, and outlined the advantages resulting in conservation of coke.

Mr. Mulcahy delved into all of the details, pertaining to proper cupola operation, the charge, melting, the chemistry of iron, and the care of the cupola and presented not only an interesting talk, but one with much educational value. He demonstrated such a thorough and complete knowledge of his subject that many members of the Chapter availed themselves of the opportunity to discuss their individual cupola problems with him after the close of the meeting.

Another feature of the program was the presentation of motion pictures of the Notre Dame-Southern California game of 1947 by Ernie Zaleski who acted as narrator. Mr. Zaleski is a Notre Dame student and a member of the 1948 football squad.

Howard Voorhees, chapter chairman, presided at the meeting. The guest speaker was introduced by Frank McGuire, chairman of the program committee.—*S. F. Krzeszewski, American Wheelabrator & Equipment Corp.*

ALUMINUM CASTING: Said to be the largest and heaviest single aluminum castings ever made in plaster, this tire mold was cast by Morris Bean & Co., Yellow Springs, O., for use by Goodyear Tire & Rubber Co., Akron, O., in making earthmover tires—the largest tires this company has ever scheduled for production. The casting is 95 in. in diam and was made in a gypsum plaster composition mold having a dry weight of 5600 lb. Aluminum in the casting weighs 2200 lb, and the tire itself will stand 95 in. high and weigh 2085 lb

Central Michigan

CENTRAL Michigan Chapter of the AFA met at the Post Products Club House, Battle Creek, Mich., Jan. 14. D. R. Bair, W. I. Gledfelder and L. W. Under, Pangborn Corp., Hagerstown, Md., presented a sound film of the Ford River Rouge Foundry and the Pangborn monorail type cleaning machine used in the Ford cylinder block line, and participated in a round-table discussion led by Jack Durr, Albion Malleable Iron Co., Albion, Mich.

Discussion dealt with cleaning room problems with particular emphasis on shot blasting equipment. It was pointed out that one of the major problems in using a centrifugal force cleaning machine is the removal of sand, which becomes mixed with the abrasive, in order to maintain effective cleaning and reduce excessive wear on the rotor vanes.

Further discussion brought out the fact that it is desirable to use grit instead of round shot for cleaning thin section castings because grit has less tendency to warp the casting. If a peening action is desired and part of the cleaning action depends upon rebound of the abrasive, then round shot is desirable.—*C. C. Sigerfoos, Michigan State College.*

Quad City

OVER 125 members and guests of Quad City Chapter of the AFA heard Harry H. Kessler, Sorbo-Mat Process Engineers, St. Louis, speak on "Gates and Risers" Jan. 19 at Fort Armstrong Hotel, Rock Island, Ill.

N. J. Dunbeck, Eastern Clay Products Inc., Jackson, O., will address the chapter Mar. 15 on the subject, "Westonite."—*C. R. Marthens, Marthens Co.*

Stress Analysis

Spring meeting of the Society for Experimental Stress Analysis will be held at Roosevelt Hotel, Pittsburgh, May 27-29. Inquiries should be addressed to Society for Experimental Stress Analysis, P. O. Box 168, Cambridge 39, Mass.

Institute Urges Tax Reforms

Machinery and Allied Products Institute, a federation of trade associations in the industrial machinery and equipment field, has published a book entitled "Capital Goods Industries and Tax Reform."

Contents of the book were presented as a statement of the institute to the Committee on Ways and Means of the House of Representatives. Subject matter is concerned primarily with the effect of taxation on the production of capital goods. Such a study naturally leads to a consideration of the impact of taxation on the whole process of capital formation and investment. The book contains a number of recommendations for reform of the present tax system and is available from the institute at 120 South La Salle St., Chicago, for 25c per copy or at reduced rates for quantities.

Plan Exposition

Third Southern Machinery and Metals Exposition will be held in Atlanta Municipal Auditorium, Atlanta, Ga., Apr. 5-8. Alva S. Wilson is exposition president, and Leslie F. Zsuffa, public relations director, Georgia Tech, will co-ordinate the conference program to be held in conjunction with the exposition.

The exposition and conference will be devoted to methods of streamlining manufacturing operations, reducing production costs, and improving quality.

Additional information and hotel registrations may be obtained from Michael F. Wiedl, managing director, Southern Machinery and Metals Exposition, 267 East Paces Ferry Rd. N.E., Atlanta 5, Ga.

To Rebuild Socony Cicero Plant

Certified Core Oil Division, Socony-acuum Oil Co. Inc., 3308 South Cicero Ave., Cicero, Ill., suffered severe damage to its 41 oil storage tanks, Jan. 28, when the plant was swept by fire and explosions. Tanks, ranging from 8000 to 25,000 gallons capacity, contained approximately 200,000 gallons of base and processed oils. Loss was estimated at $500,000. A. J. Donald, manager, has announced that production has been transferred to other Socony-Vacuum plants, and core oil shipments will be maintained. Plans for a new modern plant have been made.

HAUSFELD

METAL MELTING FURNACES

FOR

BRASS—ALUMINUM—MAGNESIUM

AND ALL OTHER NON-FERROUS METALS AND ALLOYS

GAS OR OIL FUELS

TILTING AND NON-TILTING TYPES

SINGLE AND MULTIPLE BURNERS

AUTOMATIC PROPORTIONING SINGLE VALVE CONTROL ASSURES UNIFORM RESULTS WITH MAXIMUM ECONOMY OF OPERATION.

The Campbell-Hausfeld Co.

300-320 MOORE ST. HARRISON, OHIO

Tom Makemson . .

HONORED BY BRITISH FOUNDRYMEN

By VINCENT DELPORT

THE Institute of British Foundrymen paid special tribute to its secretary Tom Makemson, in a celebration held at the Waldorf Hotel, London, Jan. 16, to mark his 21 years of service. The fact that Tom needs no introduction was evidenced by the number of congratulatory messages which poured in from all parts of the world and by the number of institute members who attended the gathering.

P. H. Wilson, president of the institute, took the chair and was seconded by D. H. Wood, immediate past president, and by Sir John Duncanson, wartime controller of iron and steel. Sir Arthur Fleming, director of research and education with the Metropolitan-Vickers Electrical Co. Ltd., attended to give a lecture after the presentation.

Mr. Wilson outlined Tom Makemson's career and recalled the many services which he has rendered the institute and the industry at large. Tom started his industrial career as a patternmaker and worked for several years with Metropolitan-Vickers (known then as the British Westinghouse Co.) at Manchester. There his interest in his fellow workers and keenness to help them was instrumental in his being put in charge of the training of apprentices. Later he entered the research department. He studied metallurgy at Manchester College of Technology and was awarded the school's associateship.

Tom Makemson was appointed secretary of the Institute of British Foundrymen in 1926 just after the general strike. The foundry industry in general, and the institute in particular, were feeling the effects of the strike, and membership of the institute at the time was about 1500. Today the membership exceeds 4000, and the part played by the secretary in bringing about this development

TOM MAKEMSON

requires no comment. Tom's connection with the institute actually precedes 1926, for he joined as a member in 1917, and became honorary secretary of the Manchester branch in 1923. His enthusiasm and will to work greatly benefited the branch and attracted the attention of the main body, which was well aware of his qualifications when it became necessary to appoint a new secretary in 1926.

Tom Makemson has served the institute since then without interruption, and although the Ministry of Supply appointed him director of iron castings of Iron and Steel Control during the war, he continued, in spite of the amount of work involved in his wartime duties, to devote some time to the work of the institute, to attend the council meetings and the annual conventions and to render the services which his experience made invaluable. For his wartime government service Tom was awarded the Member of the Order of the British Empire in January, 1946.

Tom took part in the formation of the International Committee of Foundry Technical Associations in 1925 and has served since then as its honorary secretary. He is also honorary secretary of the International Committee on Methods of Testing Cast Iron, and is a member of the council of the British Cast Iron Research Association and of many other committees.

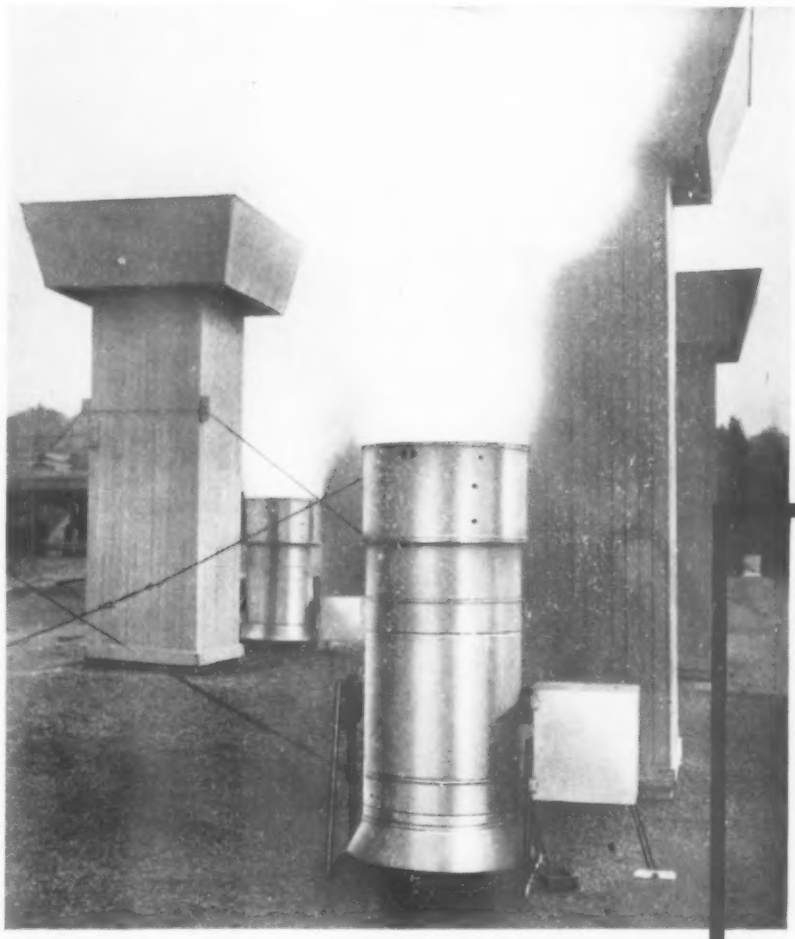
Following President Wilson, D. H. Wood, immediate past president, stressed the invaluable help that Tom Makemson had given to presidents and members of the council. He referred particularly to the constant interest taken by the secretary in the education and training of young foundrymen and recalled that, for many years, Tom had been honorary secretary of the advisory committee on examinations in foundry practice and patternmaking of the City and Guilds of London Institute.

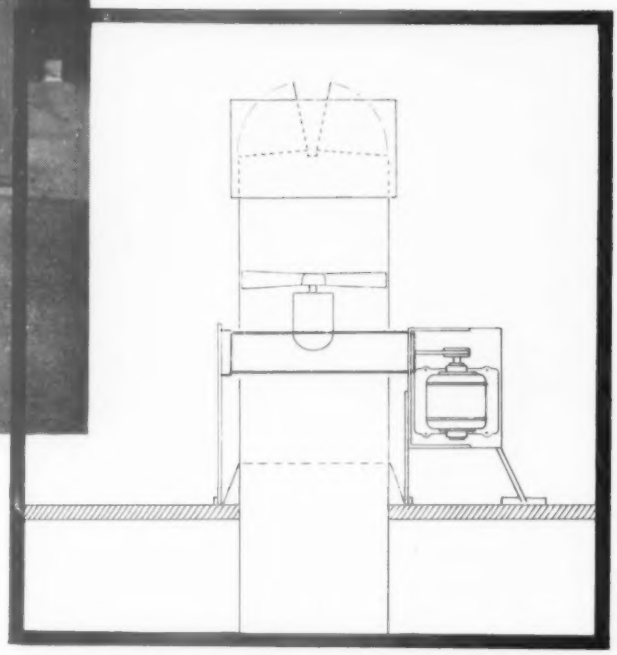
Sir John Duncanson spoke of the heavy responsibilities Tom Makemson had assumed as director of iron castings at Iron and Steel Control and

(*Concluded on page* 164)

At the speaker's table, left to right, are: D. H. Wood immediate past president, IBF; Tom Makemson; IBF President P. H. Wilson; Sir John Duncanson, wartime iron and steel controller; G. Lambert, new assistant secretary, IBF

HERE'S HOW TO HANDLE FUMES





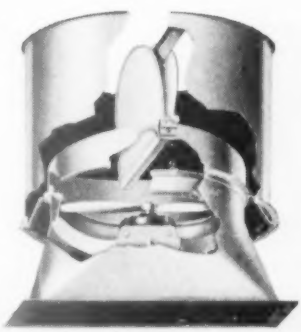
● In this installation by Wolverine Equipment Company, Cambridge, Mass., *two* belt-driven Propellair fans, exhausting corrosive fumes through stainless steel stacks, are doing a *far better job* than did *four* older-type ventilators. Fan blades and belt housing are covered with corrosion-resistant coating. Diagram shows belt-driven drumless-type Propellair installed in stack. Can be installed in any duct or pipe through small openings, without disassembly of either duct or fan.

PROPELLAIRS KEEP THE AIR CLEAR

Air movement by Propellair is the quick, *sure* way to remove dust, toxic fumes, moisture, heat. Fair weather or foul, Propellairs clear the air and *keep* it clear. They *improve* working conditions—*reduce* labor turnover—*increase* efficiency.

USE THEM WHERE YOU NEED THEM

Propellair types and sizes meet all air-moving needs. For walls, roofs, ducts, hoods, stacks, and with pedestals or stands. Fan blades and entrance rings utilize the *airfoil principle* for high-volume, *low-cost* air movement. Motor can be either in or out of air stream. Maintenance is *negligible.* Foundries everywhere find Propellairs *just what they need* to help keep production figures *high.* You'll find them helpful, too. For application advice, call in a Propellair specialist, or write for free descriptive literature.



Propellair Verti-Stack Power Roof Ventilator for standard installations.

PROPELLAIR DIVISION OF ROBBINS & MYERS • INC.
SPRINGFIELD • OHIO
"Moving Air is our Business"

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Photo—Courtesy Republic Brass Co.

STANDARD CONVEYOR COMPANY is able, through long experience, to specify and build for every foundry handling need.

Investigate Standard's complete line of roller conveyors—especially designed for foundry use. Their smooth action handles the most delicate core with little or no chance of damage. Their extra husky construction with shielded or sealed bearings give perfect protection against heat, dirt, sand, chips and grit, with resulting long time trouble-free operation.

Whatever your needs, Standard Conveyor Co. has a wide range of conveyors for foundry application. A short section—or a complete system of varying widths, weight carrying capacity or combinations can be furnished to meet individual requirements. If you want ideas on foundry conveyor applications write for bulletin F-38.

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ROLLER · BELT · SLAT · PUSHBAR CONVEYORS • PORTABLE CONVEYORS AND PILERS • SPIRAL CHUTES • PNEUMATIC TUBE SYSTEMS

(*Concluded from page* 162)

credited his personality and knowledge of the foundry industry as largely responsible for the smooth co-operation between the ministry and the industry and for the record war output of iron castings.

President Wilson then presented Tom with a silver tea set and salver and a check, the results of individual contributions by institute members. Vincent Faulkner, president, International Committee of Foundry Technical Association, followed with the presentation on behalf of the committee of a handsome loose-leaf binder containing all the messages received for the occasion. Finally, the writer, at the request of Paul Bastien, president, Association Technique de Fonderie, of France, presented Tom an inscribed wallet, a joint gift of the Association Technique and the Chambre Syndicale des Fondeurs.

Tom Makemson, in acknowledging the gifts and sentiments expressed, said that from the time he had been appointed secretary of the institute he had thoroughly enjoyed the work and had, in fact, found his "niche." He gave witty reminiscences of various episodes of his career, and referred to his journeys abroad, particularly to the AFA Philadelphia convention in 1934 and to the Cleveland convention in 1946.

As a fitting conclusion to the occasion, Sir Arthur Fleming, after paying tribute to Makemson's work from the early days when he knew him at Metropolitan-Vickers, delivered his illustrated lecture on "The Interrelation of the Engineering and Metallurgical Industries." He showed the extent by which progress in engineering methods is due to discoveries and developments in metallurgy, by bringing out better materials, better methods of control, heat treatment, and in many other respects.

Instrument Groups Plan Conference

The third Instrument Conference and Exhibit will be held at Philadelphia Convention Hall, Philadelphia, Sept. 13-17. E. Grace is chairman of the arrangements committee. The conference and exhibit is sponsored by the Instrument Society of America with the co-operation of the American Institute of Physics, Industrial Instruments and Regulators Committee of the American Society of Mechanical Engineers, and the Instruments and Measurements Committee of the American Institute of Electrical Engineers.

BAKER FORK TRUCK

WHEN CHOOSING A TRUCK *BE SURE* IT HAS

BAKER ARTICULATED FORK TRUCK

DEPENDABLE POWER

EXIDE-IRONCLAD BATTERIES

have lifting power, hauling power, lasting power . . . when you need it, as you need it, and straight through every shift. This extra power of Exide-Ironclad Batteries is due to a unique construction, which differs from that of all other batteries.

One notable difference is in the positive plate, which consists of a series of slotted tubes containing the active material. So fine are these slots that, while they permit easy access of the electrolyte, they retard the active material from readily washing out.

The results are High Power Ability, High Electrical Efficiency, Ruggedness, Long Life and Low Maintenance. Only Exide-Ironclad Batteries have ALL FOUR of those vital characteristics.

For peak performance and maximum economy, choose the batteries that 81.1%* of electric industrial truck owners prefer—Exide-Ironclad Batteries. **From a recent survey by a leading business publication.*

Write for further particulars and FREE copy of Exide-Ironclad Topics, which covers latest developments in material handling and shows actual case histories.

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32
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It's More Important than Ever...
—ANTICIPATE SAND NEEDS— WELL IN ADVANCE
and be SURE of your Source

Acute shortages of railroad equipment make it more important than ever that you anticipate and order your sand needs well in advance. Equally imperative, of course, is being sure of your source . . . knowing that you can count on receiving the proper quality and grade. You may rest assured of the precise type of sand of your preference when you order from Industrial Silica. Faithful conformance to every requirement has given leading preference to Industrial Silica sands. Definite delivery advantages are also offered by the four IS plants in the heart of the steel foundry industry.

A QUALITY AND GRADE *FOR EVERY NEED*

Industrial Silica is prepared to furnish the following: sands graded to meet your specifications for heavy, medium and light steel castings; natural, unwashed sands for heavy steel castings, runners, ladle lining and general blast furnace use; sands for aluminum and magnesium castings; for all types of gray irons and malleable, steel and aluminum cores; for acid furnace bottoms and for all types of blasting.

These
WELL KNOWN NAMES
- **PORTAGE**
- **GEAUGA**
- **COXEY**
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ARE INDUSTRIAL SILICA SANDS

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Stambaugh Bldg.
Youngstown, Ohio

Four Plants:

PHALANX, OHIO; **GEAUGA LAKE, OHIO;**
DUNDEE, OHIO; **UTICA, PA.**

CONVENTION PLANS NEAR COMPLETION

(*Continued from page* 85)

in Contact with Sand," and H. A. Schwartz will present an introduction to the four technical papers comprising the progress report of the Heat Transfer Committee.

Meetings of the steel and gray iron groups will be held Thursday and Friday, except for the gray iron shop course lectures, scheduled for 8 p.m. Monday through Thursday. "Improvement in Machineability of High Phosphorus Gray Iron," by W. W. Austin, Jr., Southern Research Institute, Birmingham, will be the topic of one gray iron session.

Speaker and topics for the shop course have been announced by Chairman K. H. Priestley, Electroloy Products Co., as follows:

Monday, J. A. Bowers, American Cast Iron Pipe Co., Birmingham, "Cupola Coke in Relation to Carbon Control"; Tuesday, B. P. Mulcahy, engineering consultant, Indianapolis, "Effect of Blast Variation on Cupola Control"; Wednesday, T. W. Curry, Lynchburg Foundry Co., Lynchburg, Va., "Front Slagging of the Cupola"; Thursday, Rudolph Flora, Clover Foundry Co., Muskegon, Mich., "Factors Affecting Fluidity of Cupola Iron."

Gives Program Highlights

Chairmen are, respectively, W. W. Levi, Lynchburg Foundry Co.; H. H. Wilder, Foundry Division, Eaton Mfg. Co., Vassar, Mich.; E. J. Burke, Hanna Furnace Corp., Buffalo, N. Y., and K. H. Priestley.

Highlights of the five-day convention include AFA's annual business meeting, Wednesday morning, when officers and directors will be elected; Philadelphia Day, Tuesday, on which day exhibits will remain open until 9 p.m.; the dinner meeting of chapter officers and directors, Tuesday; annual gathering of Canadian foundrymen, which this year will be a dinner, Wednesday, rather than the customary luncheon, and the annual banquet, Friday.

Dr. Karl T. Compton, president of Massachusetts Institute of Technology, Cambridge, will be the guest speaker at the banquet that will climax the 52nd annual meeting. He will speak on "Team Play of Hand and Brain."

Head of MIT since 1930, Dr. Compton has participated in many developments of national and international significance in the application of science to the war effort and, more recently, to industrial recovery.

(*Continued on page* 168)

Handling Sand is a Cinch

at . .
Woodruff & Edwards Fdy.
Elgin, Ill.

with a HOUGH PAYLOADER
SAY "HUFF"
PATENTED

Above: 7 tons of sand per hour delivered from stockpiles to molding stations a block distant.

Below: Also returns used sand to hopper for conveying to reclaiming room.

Saves Time...Saves Labor...Speeds Production!

The Model HA Payloader pays off at Woodruff & Edwards Foundry, Elgin, Illinois. It delivers all sand to molding stations — 7 tons per hour from stockpiles a city block distant — travels through 57" aisles, and narrow station entrances. Hydraulic bucket dump enables bucket loads to be parcelled out to several stations during peak demand periods to keep all molders busy.

This Payloader also removes used sand from molding stations and delivers it to hopper for return to reclaiming room. Between times it charges the sand muller, does general clean-up work, removes snow from yard.

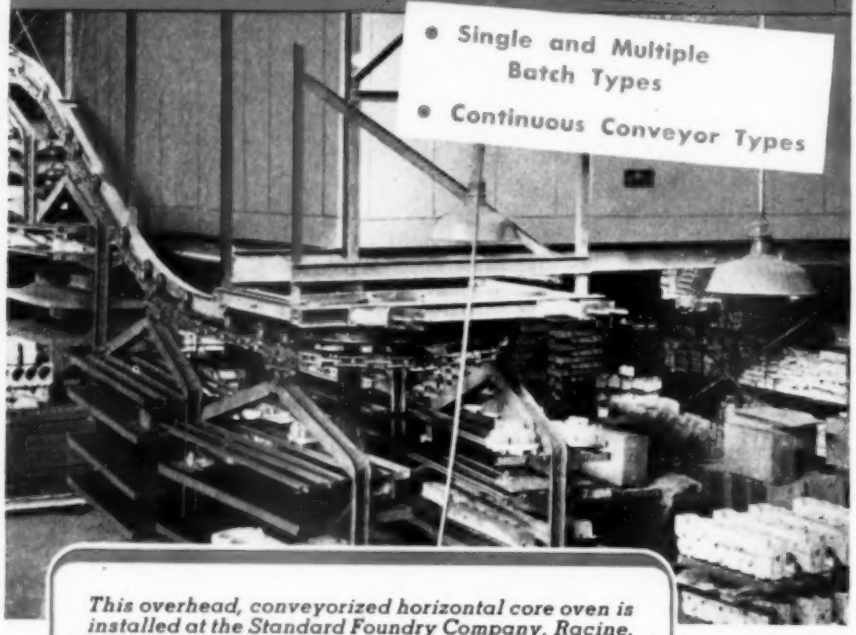
This is another of many foundry installations where Payloaders are solving labor problems, speeding production and increasing overall efficiency. It will pay you to get complete facts on all the Payloader Shovels — the 10½ cu. ft. Model HA, the ¾ yd. HF, the 1¼ yd. HL — Also the 2 yd. Payloader Buggy.

TRACTOR SHOVELS SINCE 1920

THE FRANK G. HOUGH CO.

703 Sunnyside Ave. Libertyville, Ill.

NEWCOMB-DETROIT
Core AND Mold Ovens

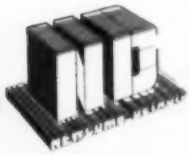


This overhead, conveyorized horizontal core oven is installed at the Standard Foundry Company, Racine, Wisconsin. It is equipped with racks and monorail conveyor. The work enters the oven from below at the far end. Direct fired gas pressure type burner with auxiliary equipment installed on the overhead platform at one end of the oven.

Although the design of the oven may vary to suit the individual applications, all Newcomb-Detroit Core and Mold Ovens embody carefully engineered principles of construction and heating. The following advanced features are in every installation . . .

- ✶ Convection heating provides controlled air circulation . . . faster baking.
- ✶ Automatic controls assure exact baking conditions . . . uniform results.
- ✶ Spill fan disposes of contaminated air . . . provides proper ventilation at all times.
- ✶ Engineered cooling zone cools cores to proper temperature before removal.
- ✶ No heat, smoke or acrid fumes escape to core room.
- ✶ Sturdy construction . . . built to withstand heavy usage on foundry operations.

SEND FOR BULLETIN ON CORE AND MOLD OVENS



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NEWCOMB-DETROIT COMPANY

Grand Rapids Division
GRAND RAPIDS, MICH.

Main Office and Plant
5741 Russell Street
DETROIT 11, MICHIGAN

Western Sales Office
CHICAGO, Ill.

(*Continued from page* 166)

AFA gold medals will be presented at the banquet. Winners in the annual apprentice contest will receive their cash prizes and certificates at the business meeting from AFA President Max Kuniansky, Lynchburg Foundry Co.

Charles E. Nelson, technical director of the magnesium division, Dow Chemical Co., Midland, Mich., will deliver the second annual Charles Edgar Hoyt Lecture, "The Control of Grain Size in Magnesium Castings," at the business session.

Fred G. Sefing, International Nickel Co., New York, chairman of the Educational Division, has annouced that M. J. Gregory, retired foundry superintendent of Caterpillar Tractor Co., Peoria, Ill., and a past AFA director, will be the speaker at the group's Monday round-table dinner. His topic is "Management's Responsibility in the Development of Personnel."

Discuss Many Subjects

Educational meetings will be held Monday and Tuesday, and the division will also sponsor the Engineering School Graduates Luncheon, Wednesday. Speaker at the luncheon will be Prof. R. M. Brick, director of the department of metallurgy, University of Pennsylvania, Philadelphia, who will discuss "Engineering Education."

Brass and bronze meetings are scheduled for Monday and Tuesday; pattern, Tuesday and Wednesday; and sand, Wednesday and Thursday, except for the sand shop course—8 p.m. Monday through Thursday.

L. F. Tucker, City Pattern & Foundry Co., South Bend, Ind., vice chairman of the pattern group, is to preside Wednesday at the pattern round-table luncheon. Co-chairman is H. K. Swanson, head of the East Chicago, Ind., pattern and model works bearing his name. Martin Rintz, Continental Foundry & Machine Co., East Chicago, will be discussion leader for the round table.

Preliminary plans for the annual ladies entertainment program have been announced by Committee Chairman W. J. Williams, New Jersey Silica Sand Co., Millville, N. J. The program will include a fashion show and tea at Wanamaker's store, Tuesday; Wednesday, a tour of historic Philadelphia sites in the morning, and a visit to Franklin Institute in the afternoon; Thursday, a trip to Valley Forge. Registration for the ladies will be at the Benjamin Franklin Hotel, Monday.

Other committees appointed by the Philadelphia Chapter to handle vari-

(*Continued on page* 170)

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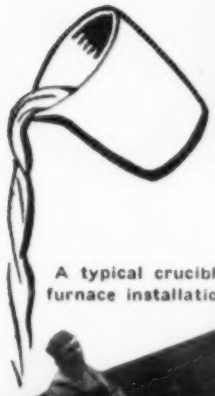

A typical crucible furnace installation.

Seven busy furnaces, one furnace man in the Associated Foundries Plant in Cleveland.

IN NON-FERROUS MELTING, when you can turn out the work with minimum labor requirements together with low investment costs, you have something to talk about. That is the reason in non-ferrous melting, crucible furnaces are a more than 8 to 1 favorite.

The census shows that of 3218 non-ferrous foundries, 2818 or 87.5% use crucible melting, substantial evidence of the preference among foundrymen.

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Send for Crucible Melters Handbook; mailed free.

CRUCIBLE MANUFACTURERS ASSOCIATION

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(*Continued from page* 168)

ous arrangements for the five-day meeting have been active for a number of weeks. Personnel of the different committees follows:

General Committee on Arrangements—Chairman, John M. Robb Jr., Hickman, Williams & Co.; co-chairman, William B. Morley, Olney Foundry Division, Link-Belt Co.; secretary-treasurer, Roger J. Keeley, Ajax Metal Co.; B. A. Miller, Baldwin Locomotive Works, Eddystone, Pa.; W. B. Wilkins, American Manganese Bronze Co.; Stanley C. Kirn, M. L. Kirn & Bros. Inc.; Harry L. McClees, Crucible Steel Casting Co., Lansdowne, Pa.; Hermann P. Good, Textile Machine Works, Reading, Pa.; George F. Pettinos Jr., George F. Pettinos Inc.; Thomas J. Gerwig, Republic Steel Corp.

Publicity and Philadelphia Day Committee—Chairman, J. L. Furey, Swan Finch Oil Corp.; co-chairman, A. J. Saute, American Engineering Co.; R. M. Anson, Crucible Steel Casting Co., Lansdowne, Pa.; G. H. Bradshaw, Philadelphia Navy Yard; E. F. Nunemacher, Selas Corp.; R. R. Belleville, Joseph Dixon Crucible Co.; Harold L. Henszey, Carborundum Co.; George Sullivan, Hanna Furnace Co.; Harry Winters, J. S. McCormick Co.; H. E. Schellhase, Pangborn Corp.

Plant Visitation Committee—Chairman, C. W. Mooney Jr., Olney Foundry Division, Link Belt Co.; co-chairman, Edward Berry, Dodge Steel Co.; Harvey J. Johnston, General Steel Castings Corp., Eddystone, Pa.; Warren A. Brown, Florence Pipe Foundry & Machine Co., Florence, N. J.; H. M. Stuart, United States Pipe & Foundry Co., Burlington, N. J.; George Bradshaw, Philadelphia Navy Yard; John Csaklos, Crucible Steel Casting Co., Lansdowne, Pa.; W. D. Bryden, Philadelphia Brass & Bronze Co.; R. E. Schmidt, Rolle Casting Co., Lansdale, Pa.; Robert Carrigan, North American Smelting Co.

Reception Committee—Chairman, H. E. Mandel, Pennsylvania Foundry Supply & Sand Co.; co-chairman, A. A. Thum, Palmyra Foundry Co., Palmyra, N. J.; F. L. Mattson, Hickman, Williams & Co.; John P. Hoot, Carson, Marshall Co.; A. H. Scherer, Acme Brass & Bronze Foundry Inc.; G. H. Bradshaw, Philadelphia Navy Yard; J. E. Finnegan, Colonial Smelting & Refining Co., Columbia, Pa.; M. Calciano, Chas. Mousley's Sons; William Davies, Reading Foundry Co., Reading, Pa.; H. Lloyd Hess, Lancaster Malleable Casting Co., Lancaster, Pa.; C. H. Meminger, Lancaster Iron Works Inc., Lancaster, Pa.; Werner Finster, American Chain & Cable Co., Reading, Pa.; Harry D. Horton, Ingersoll-Rand Co., Phillipsburg, N. J.; Robert Latham, Bethlehem Steel Co., Bethlehem, Pa.; N. H. Oliver, Downingtown Mfg. Co., Downingtown, Pa.; John Juppenlatz, Lebanon Steel Foundry, Lebanon, Pa.; Stanley G. Flagg III, Stanley G. Flagg & Co.; J. A. March, Camden Foundry Co., Camden, N. J.

Paul B. Harner, Union Mfg. Co. Inc., Boyertown, Pa.; William Jones, National Engineering Co., Drexel Hill, Pa.; C. B. Somers, Whitehead Bros., Maplewood, N. J.; John W. Mentzer, Taggart & Co.; H. D. Ritter, Sanitary Co. of America, Linfield, Pa.; James W. Lanning, Perseverance Iron Foundry; Charles Hamburg, Bonair Foundry Co.; Edward C. Benkert, Fairmount Foundry Inc.; Raymond Teach, Werner G. Smith Co., Haverford, Pa.; J. J. Edmiston, U. S. Graphite Co., Upper Darby, Pa.; Harry S. Enderlein, Enderlein Iron Foundry; C. P. Speitel, Carbon Malleable Castings Co., Lancaster, Pa.; William H. Cantwell, Eastern Malleable Iron Co., Wilmington, Del.; N. T. Booth, Deemer Steel Castings Co., New Castle, Del.; John F. McKinney, Sun Shipbuilding & Dry Dock Co., Chester, Pa.

Entertainment Committee—Chairman, W. J. Gallana, Rogers Brown-Lavino Co.; co-chairman, Louis Dill, George F. Pettinos Inc.; William Thawley, Philadelphia Nonferrous Foundry Inc.; S. C. Kirn, M. L. Kirn & Bro. Inc.; A. C. Gocher, Fletcher Works Inc.; Horace Witherington, H. W. Butterworth & Sons Inc., Bethayres, Pa.; Herman Mandel, Pennsylvania

(*Concluded on page* 172)

350 Feet of Conveyorized Core Ovens DoDgE a Maze of 55 Posts 10′ Centers

ENGINEERS Draw on 46 Years of Experience to Lick Another Tough Problem

Flexibility of DESPATCH equipment—plus 46 years of accumulated oven experience—made the planning and installation of these two conveyorized ovens "just another job" for DESPATCH engineers. These two gas-fired ovens modernized the corebaking facilities of a large Midwest manufacturer of farm tractors.

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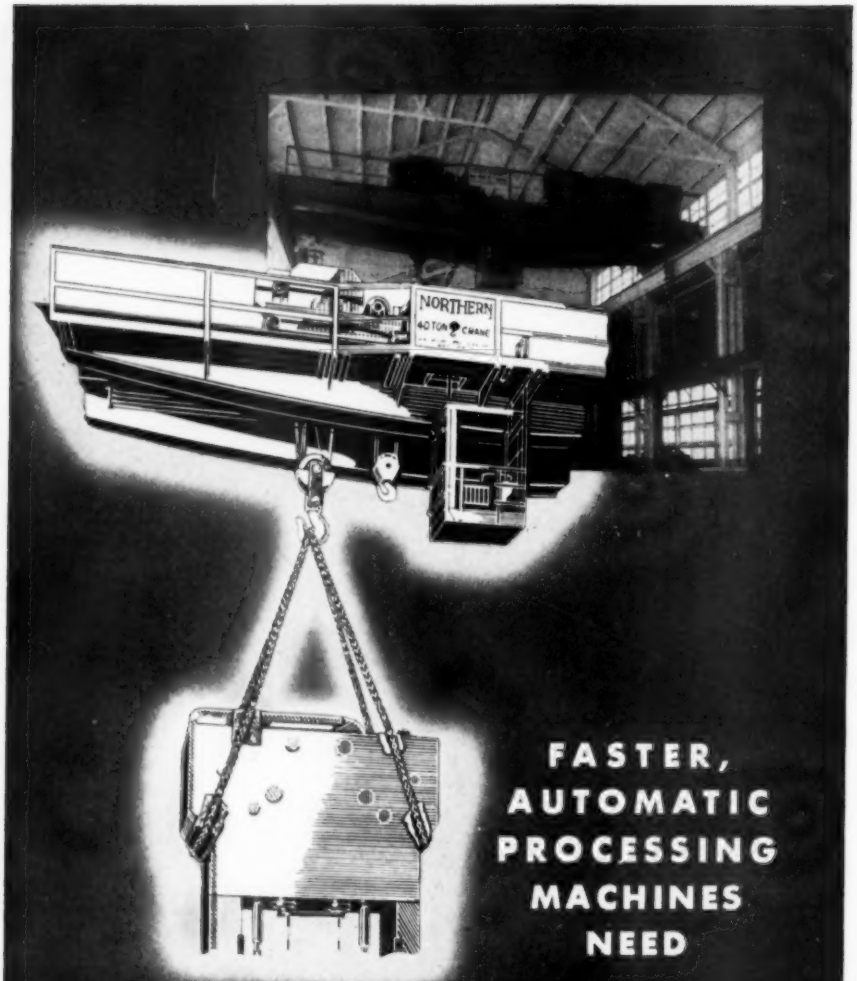

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(*Concluded from page* 170)

Foundry Supply & Sand Co.; Paul Brooks, Debevoise-Anderson & Co.; Leonard E. Bilger, Keystone Gray Iron Foundry Co., Pottstown, Pa.; Joseph A. Keeth, Penn Steel Castings Co., Chester, Pa.; George Bewley, Bethlehem Steel Co.; Nelson H. Albright, Columbia Malleable Castings Corp., Columbia, Pa.; D. G. Burkert, Eastern Foundry Co., Boyertown, Pa.; C. L. Coppage, Pusey & Jones Corp., Wilmington, Del.; Thomas Walker Jr., Warren Pipe & Foundry Co., Phillipsburg, N. J.; M. J. Moore Jr., Empire Steel Castings Inc., Reading, Pa.; R. S. Munson, Atlantic Steel Castings Co., Chester, Pa.; Kermit Matz, North Bros. Mfg. Co.; Nathan Klein, Caloric Stove Corp., Topton, Pa.; Frank E. Schumann, Lehigh Foundries Inc., Easton, Pa.; William J. Johnson, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.; T. F. Miller, Schneider Bowman Co.; George Schmidt, Philadelphia Bronze & Brass Corp.; Robert Fretch, Union Bronze Co., Reading, Pa.

Ladies' Entertainment Committee — Chairman, Howard J. Williams, New Jersey Silica Sand Co., Millville, N. J.; co-chairman, Mrs. Howard J. Williams; Mrs. Charles W. Mooney; Mrs. M. B. Valentine; Miss Irene Gocher; Mrs. Donald Bryden; Miss Dorothea M. Thum; Mrs. C. W. Thompson; Mrs. Edward C. Benkert; Mrs. Kermit Matz.

BRONZE FOUNDING

(*Continued from page* 89)

note that it would not be a difficult matter to fit gas-scavenging methods as an integral part of such melting equipment. In the case of the rocking arc, and furnaces of similar type, the design could readily incorporate a special tuyere for introducing the scavenging gases to the melt with the minimum of trouble to the founder.

Deoxidation—The amount of phosphorus required to deoxidize degassed gunmetal and ordinary tin-bronzes will vary according to the degree of oxidation treatment given to the metal, as indicated in Table III. These phosphorus percentages represent maximum additions to the molten metal; the residual phosphorus content in the final castings should be considerably less than the figures shown and preferably around 0.01-0.02 per cent.

Melting furnaces—During the last few years there have been no radical changes in the design of furnaces for nonferrous metal melting. As mentioned previously, greater interest is being shown in the use of electric melting methods. Lift-coil induction furnaces are the latest to be added to the range of equipment produced in Great Britain by Birlec Ltd. The lift-coil furnace is easily adapted to existing lay-out, takes up little space, and can be switched from one alloy to another simply by substituting another crucible. The advantage of greater flexibility overcomes its slightly lower efficiency and, more important still, no ladles are required. One particularly useful arrangement

(*Continued on page* 174)

FREEMAN *Dowmetal* PATTERN PLATES

All Plates Shipped Same Day Order is Received

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Many foundries are already using FREEMAN PATTERN PLATES as they are LIGHTER, STRONGER and IMMEDIATELY AVAILABLE in ANY SIZE AND QUANTITY. Surfaces are held to CLOSE PARALLEL TOLERANCES and plates are of UNIFORM THICKNESS.

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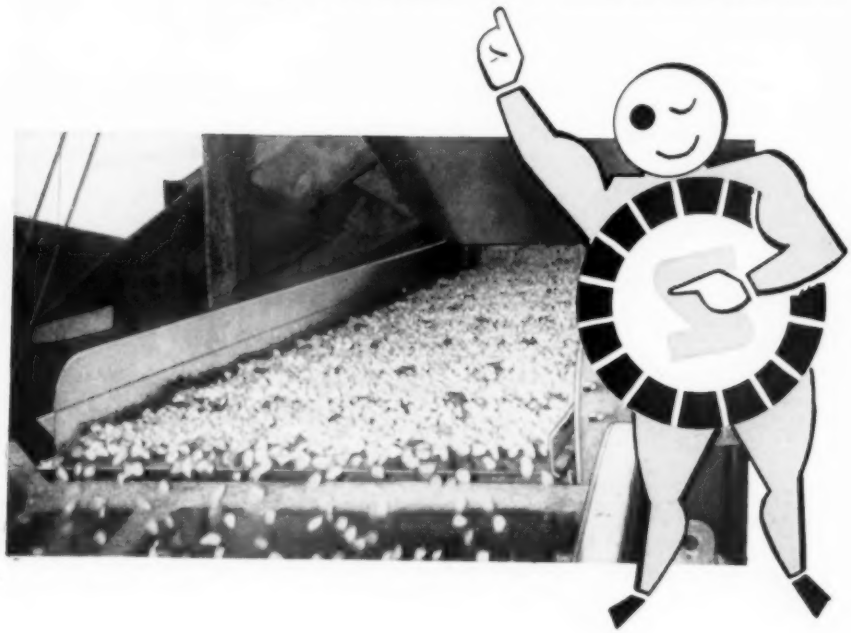

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SCREEN EQUIPMENT COMPANY, INC.
PRODUCERS OF VIBRATING SCREENS EXCLUSIVELY
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(*Continued from page* 172)

of the lift-coil furnace embodies two crucibles mounted on a bogie and track arranged with end stops, as shown in Fig. 4. After the first crucible of metal is melted the induction coil is lifted and the bogie is moved to position it automatically in the proper location under the coil for melting the metal in the second crucible.

Due to the coal shortage in Great Britain, and the government's endeavor to relieve the position by subsidizing the use of oil, a considerable amount of old plant has been replaced by modern types of oil-fired furnaces similar to that shown in Fig. 5. Considerable attention has been given to the incorporation of clear-reading blast gages and fixed burners, to maintain maximum fuel-efficiency.

In the case of gas-fired furnaces automatic burners are being developed, in which the air and gas supplies are operated by a single control which eliminates double adjustment of burners.

Pouring methods—During the past few years slow-pouring methods have been adopted in Great Britain with marked success, for the production of chill-cast solid and cored bronze and gunmetal sticks and billets. While slow pouring methods are by no means new, their application in the nonferrous foundry has received a marked incentive following the work done by Pell-Walpole[7] in collaboration with the Tin Research Institute. When used in conjunction with metal suitably degassed by oxidation-reduction or gas-scavenging, and properly prepared mold and cores, slow pouring effects a very marked improvement in the quality of all bronze and gunmetal sticks and billets varying in size from 1/12-in. in diameter.

From the results of the above investigation it has been found that the use of certain types of aluminum paint for dressing chill molds prevents "blowing" and gives improved surface-finish on the bronze stick. It should be emphasized, however, that only those aluminum paints with a strong resinous or oily base should be used.

For the production of hollow chill-cast sticks and billets it is recommended that an asbestos-wrapped core should be employed for cores up to 2½ in. in diameter, and a split chill-core for larger sizes.

For cores up to 2½ in. diameter and up to 3 ft long, wrap with asbestos paper (0.015-in. thick), allowing one complete wrapping per 1 in.

(*Continued on page* 176)

...for sand handling equipment in modern aluminum foundry!

SAND IN ITS PLACE is alright, but not when it floats in your plant . . . falling on valuable equipment . . . causing wear and health hazards. In modern foundries, like that of Nylen Products Co., St. Joseph, Michigan, the dust raised by sand handling equipment is put in its place by a KIRK & BLUM Dust Collecting System.

Nylen Products Co. manufacturers of aluminum pistons and pins, uses large amounts of sand in the casting processes. The photo looking up into the sand tower shows the streamlined type Kirk & Blum fittings which promote top efficiency in air and dust handling.

The experience of more than 40 years and the talents of many engineers go into the design and installation of every KIRK & BLUM System. KIRK & BLUM Engineers will gladly provide an expert, no-obligation survey of your dust collecting problems and needs. Write for Descriptive Booklet M, "Dust Collecting Systems in Metal Industries." The Kirk & Blum Mfg. Company, 2808 Spring Grove Ave., Cincinnati 25, Ohio.

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TYPE V, illustrated above, is priced at $210.00 complete, and is one of several available types.

COMBS Gyratory Foundry Riddles and equipment are distributed by Foundry Supply Houses throughout the United States and Canada . . . ask your supply house for details on our wide range of sizes.

Great Western Manufacturing Company

LEAVENWORTH, KANSAS

(*Continued from page* 174)

thickness of the steel or iron-core tube, which should have a smooth surface and preferably be tapered 1/16-in. on diameter per foot of length. For parallel cores double this thickness of asbestos paper is required. The paper must be sealed on to the core tube with a suspension of 5 per cent aluminum powder in a 2 per cent solution of dextrin or core-gum in water, which also acts as the core-coat. The coated core should be baked for not less than 15 minutes at 300° C before use. After the casting has solidified, and cooled to about 300° C it should be quenched in water and allowed to stand for a few minutes when the core should knock-out readily.

Larger Cores Are Split

Cores having a diameter greater than 2½ in. should be split vertically into four uniform sections and a cut of 0.015-in. per in. of core diameter should be taken from each radial face. The four sections are then heated to about 100° C, dressed with resinous aluminum paint, and set up in the mold with asbestos paper inserts (previously baked at 300° C) as shown in Fig. 6. When the casting has cooled to approximately 300° C, one-quarter of the core may be knocked out, so releasing the others.

In both the above cases the casting should be slowly top-poured, preferably through a preheated moisture-free refractory basin with jet runners. The pouring rate is obtained from the formula $R = KD$, where R is the rate in pounds per minute, K a constant depending on phosphorus content, D the sum of the internal and external diameter of the casting. K should be taken as 6 when phosphorus content is less than 0.25 per cent and 5 for 0.5-1.0 per cent phosphorus. The number of jet runners employed should be as follows: Two jet runners for castings up to 2 in. diam; four jet runners for castings up to 4 in. diam; six jet runners for casings up to 8 in. diam; twelve jet runners for castings above 8 in. diam.

Following the successful results obtained by the use of slow-pouring methods for chill-cast sticks and billets, several British founders have applied a similar technique to the production of large sand castings, with promising results. In general, however, the best results on copper-base alloy castings have been obtained by adopting the gating methods exemplified in Figs. 11 and 12.

When pouring aluminum bronze or high tensile brass, an endeavor is made to avoid dross-formation by

(*Continued on page* 178)

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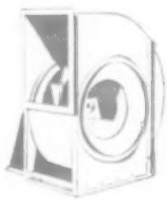

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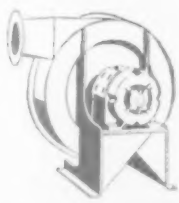

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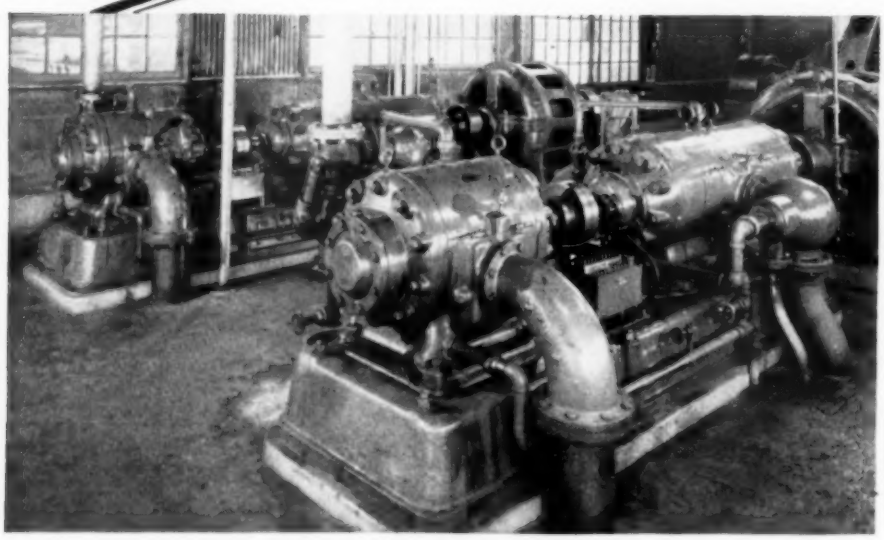

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C-161

Fuller

A LIFETIME OF NEW MACHINE EFFICIENCY

(*Continued from page* 176)

utilizing gating methods which give streamline flow. Turbulence is avoided as far as possible by bottom-pouring, using one or more tapered ingates, with the large end against the casting and the total area of the small ends slightly less than the area of the downgate. These principles are clearly outlined in the photograph of the small aluminum bronze propeller casting shown in Fig. 12.

In the founding of gunmetal and bronze castings, particularly those required to withstand pressure, the modern tendency is to utilize choke gates directly connected to the risers or feeding heads, as illustrated in Fig. 11, rather than the older practice of direct riser pouring.

Feeding methods—In 1942, the development of atmospheric feeding methods (Fig. 8) in the United States by Taylor and Rominski[8] created considerable interest in foundry circles and received wide publicity in the technical press. This development may be superseded by the gas-pressure feeding methods recently suggested in Great Britain by Jazwinski and Finch.[9] In brief, high-pressure feeding is effected by enclosing within the feeding head a small capsule containing materials which, after a short delay, liberate both heat and an inert gas under pressure. A diagrammatic drawing of the arrangement is given in Fig. 9. The purpose of the delay, controlled by the time required to melt the container of the capsule, is to ensure solidification of the outside surfaces of the feeding head and downgate so that the full pressure of the liberated gas forces liquid metal into the casting. It is claimed that by the use of this method sound steel castings are obtained, with a yield varying from 75-95 per cent against 60 per cent using ordinary gravity feeding-heads. Experiments now being conducted with gas-pressure-heads on copper-base alloy castings are giving encouraging results.

Necked or "knock-off" risers are being increasingly employed, both in Great Britain and the United States, to facilitate and reduce the cost of their removal from the casting. In the production of iron and steel a thin core is usually inserted between the feeder and the casting to form the "neck." So far as brass and bronze castings are concerned, the latest information[10, 11] indicates that the use of graphitic carbon disks, in conjunction with heat-insulated riser sleeves, is to be preferred. The carbon disks can be made from graphite electrodes and the size of disk selected for any given riser is always 2

in. larger than the diameter of the riser, thus allowing a 1-in. circumferential shoulder for a print. On the top surface of this print is placed a gypsum or other heat-insulating sleeve. (See Fig. 7). The central hole in the carbon disk should be 20-25 per cent of the diameter of the riser. To ensure breakage of the riser slightly above the casting surface, both the top and bottom edges of this central hole are bevelled with a file. (Occasionally several ⅛-in. diameter holes are drilled midway between the center and outside edges of the carbon to aid venting of the mold). The thickness of carbon disk required varies according to the diameter of feeding head employed, as follows:

Thickness of Carbon Disk	Diameter of Feeding Head or Riser
⅛-in.	up to 6 in.
3/16-in.	6-10 in.
¼-in.	over 10 in.

Castings are generally run from the bottom until the metal comes through the riser neck, after which pouring is completed down the riser.

The gypsum riser sleeves are made from equal parts (by weight) of gypsum, to which has been added 20 per cent portland cement, and water. This slurry is poured into metal molds to form the sleeves, following which they are air-dried for 2 hours and then baked at 260° C for 10 hours.

Necked risers may effect as much as 45 per cent reduction in cleaning room costs when removing 3-in. diameter risers and up to 80 per cent with 9-in. risers. Furthermore, the use of gypsum sleeves enables the risers to be made 30 per cent smaller than when made in the ordinary way without sacrifice of feeding power. In many instances feeding may actually be improved.

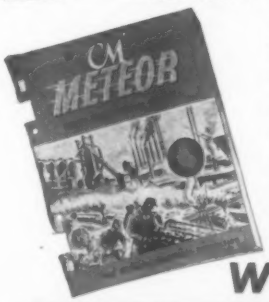
A material recently developed in the United States by the Pittsburgh Metals Purifying Co., called Thermotomic,[12] shows interesting possibilities as an alternative to the graphite disks used in necked risers. This material is supplied in a form much like sand and only requires mixing with 4-6 per cent water before using. After ramming into the required shape it is thoroughly dried at 180°-200° C. On contact with molten metal it glows with a strong but controllable exothermic reaction. In a confined area, such as a feeder head, temperatures in the range of 400° C will start the reaction. It is claimed that Thermotomic will impart no impurities to the metal and that it has no detrimental effect on foundry sands. It is possible that this mate-

(*Continued on page* 182)

Foundry work moves faster with

2 SPEED METEOR ELECTRIC HOISTS

Capacities from ½ to 3 tons



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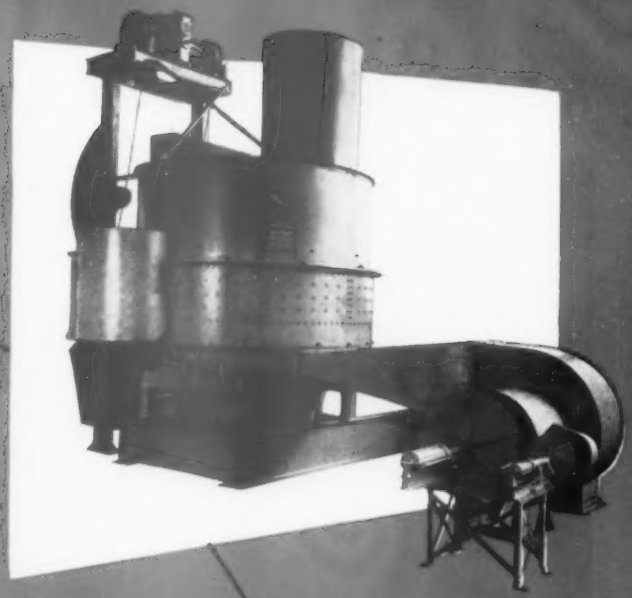
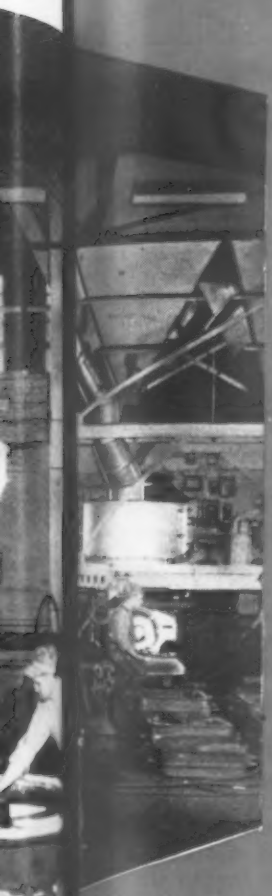
AND A

SANDSLINGER

B&P



Ottumwa's No. 70 Speedmullor mulls and cools 250 tons of sand per day in 1½ minute cycles



Away with the old . . . and why not—when the new means a Speedmullor that mulls and cools a batch of sand every 1½ minutes, or a total of 250 tons a day. Ottumwa Iron Works knows how fast a Speedmullor can lead a foundry to modern, profitable production. Ottumwa knows, too, that without their Motive Jr. Sandslinger they'd be way behind the times. Their "Slinger" travels up and down the foundry bay on a 110 foot track, ramming molds of various sizes and shapes on both sides of the track. Large gear molds that once took days to ram and finish are made with the Sandslinger in a few hours. The Speedmullor and Sandslinger are speedy, efficient workers! They have saved Ottumwa many man hours. Their use has provided ⅓ more floor space, reduced scrap losses 30%, and increased their casting output. Ottumwa modernized . . . why not investigate?

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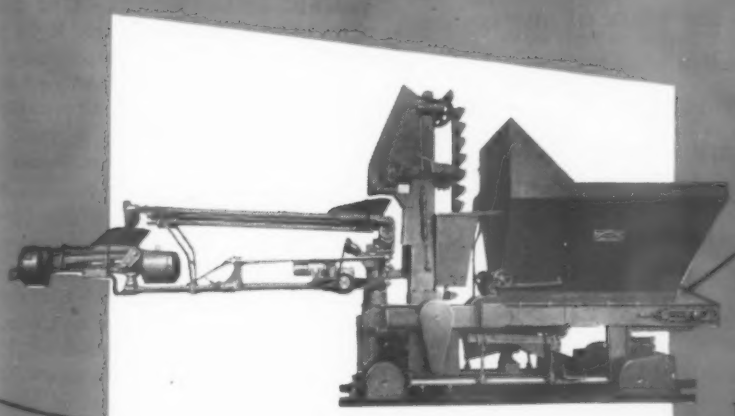

The Motive Jr. Sandslinger rams Ottumwa's molds of all sizes and shapes with speed and uniformity—resulting in higher quality and lower losses.

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(*Continued from page* 179)

rial might also act as a substitute for the "gas-producing" capsule utilized by Jazwinski and Finch in their gas-pressure-feeding methods.

Molding methods — Research of a fundamental nature conducted by both the British Nonferrous Metals Research Association[2] and by Pell-Walpole[13] has shown that degassed metal may be spoiled by contact with moisture, whether from pouring basins or from sand in the molds, etc. This effect is particularly noticeable in phosphor bronzes, and the amount of gas absorbed, and the resultant degree of gas-unsoundness, increases with the phosphorus content of the melt. For example, alloys containing 10 per cent tin and up to 0.3 per cent phosphorus absorb very little gas when poured at temperatures up to 1130° C. With larger phosphorus contents and higher pouring temperatures considerable gas-absorption occurs. Drying the sand mold at 200° C does not prevent gas-absorption, but drying at temperatures between 800°-900° C.—e.g., high enough to dehydrate the clay bond, eliminates the effect. A great deal of work still needs to be done in the study of "metal-mold" reactions before a complete answer to this problem is obtained, but in the meantime it is interesting to note that properly dried molds made from silica or sea sand bonded with linseed oil and dextrine give minimum gassing. In the production of phosphor bronze sand castings it is important to keep the phosphorus content as low as possible and certainly below 0.3 per cent, or alternatively to employ a mold which will not evolve water vapor when heated.

The index to Volume 75 of THE FOUNDRY, listing by title, subject matter and author the editorial material published during 1947, is available for distribution. Subscribers may obtain copies on request.

This review would not be complete without some mention of the recent work done by British nonferrous founders and users of castings, in cooperation with the British Standards Institution, in evolving a Code of Procedure in the Inspection of Copper-base Alloy Sand Castings.[14] This code bases the assessment of quality on the casting itself, according to the duty it has to perform, and fixes the function of separately cast test bars, of standard form, only as an index of the quality of the material em-

ployed for casting production. It is emphasized that the true function of a test bar is to provide an indication of the quality of the metal from which it is cast. It must, therefore, be sensitive to the effects of dissolved gas, which is not always evident on many types of test bars at present in use. Furthermore, from the economic point of view, the form of test bar adopted as a standard should entail minimum wastage of metal and machining time, and yet provide adequate means of easily obtaining a sound and fully fed bar. With these facts in mind it is recommended that the design shown in Fig. 10 should be tentatively adopted as a standard form of test bar for copper-base alloy castings and that it should be used wherever possible. Preliminary tests[15] have indicated that the properties obtained from this type of test bar are likely to satisfy the demands of most British Standard Specifications for cast copper-base alloys, providing they are properly treated in the foundry.

Inspection methods of this kind are quite new to makers of copper-base alloy castings, although familiar enough to light alloy founders producing aircraft parts. They provide the incentive for improving the quality of castings, and lead to greater co-operation with the designer and user. They are, therefore, likely to play no small part in future developments in the brass foundry.

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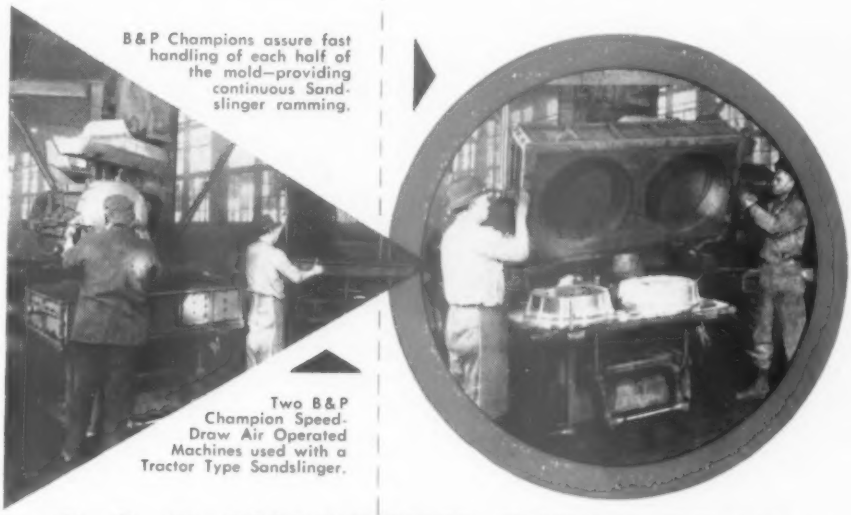

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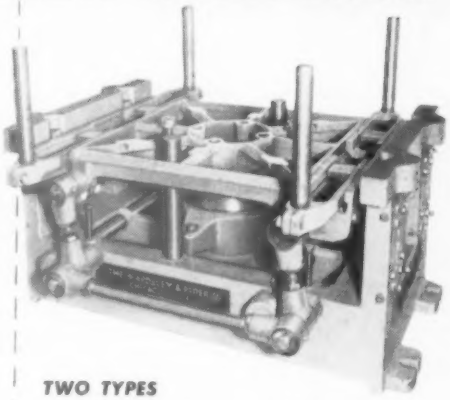

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CURRENT MELTING PROBLEMS IN THE GRAY IRON FOUNDRY

(*Continued from page* 79)

perature becomes in the superheating zone.

When we were still able to get high quality foundry cokes we knew that with some types of oven coke and with beehive coke we could produce lower total carbon irons than with other types of foundry coke. The postwar decline in coke quality has had a tendency to make all types of oven coke more suited to producing lower total carbon irons. The tendency toward lower total carbon irons resulting from a decline in coke quality could be offset by changing the weights of the metal and fuel charges to smaller units and by stepping up the operating speed of the cupola either by handling more iron per hour or lining the cupola down and handling the same amount per hour as at present.

Learn to Use Raw Materials

I have hoped for a long time that the gray iron foundry industry would become as alert and as adept as the steel industry has been in its utilization of raw materials. Though the current emergency may exact a toll for our education, what looks very black now will stimulate us to better utilization of raw materials in the future.

I know of a new gray iron foundry established in Iowa during 1947. The top personnel of this compay had no prior experience with gray iron except in a very minor way. In the main their past experience was in the fields of management, the steel foundry and in steel mills. When they started production, their order book was made up largely of automotive and automotive type castings for farm implement manufacturers. They had no contacts with any pig iron suppliers—and they operated without pig iron. They experienced some headaches, but consider that they had first to equip a foundry to make gray iron when this material had not been made before, second that they had to build and train a working force, third that they

(*Continued on page* 186)

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(*Continued from page* 184)

had no prior experience with gray iron as an engineering material, fourth that they waded into the automotive field of modest sections requiring good machinability, fifth that they started up without pig iron, and sixth that they have been successful. And I think we could find many other parallel cases in this country.

Edgar Guest, the Detroit newspaper poet, wrote a poem, "Somebody Said It Couldn't Be Done" but he with a chuckle replied "That maybe it couldn't, but he would be one who wouldn't say no, till he tried"—etc. etc., "and the job that couldn't be done was done."

After things are done by trial and error methods for a period of time, there finally comes a time when someone studies the accumulated data from trial and error methods and evolves a principle or formula as a guide. Cupolas are still being operated by trial and error methods, but enough principles have been determined to assure real melting performance if foundry equipment manufacturers and foundry management would make up their respective minds to employ these principles.

Varies as Diameter Squared

In the first place, the capacity of any cupola to do work depends on its size. A 48-in ID cupola is not twice the size of a 24-in. cupola; it is four times as big. A 48-in. cupola is not two-thirds as big as a 72-in.; it is only 44 per cent as large. The respective hearth areas of 24, 48 and 72-in. diameter cupolas are 3.1, 12.6 and 28.3 sq ft.

In the second place, each square foot of hearth area in the cupola must do as much work as any other square foot of hearth area, and to accomplish this all areas must receive equal and proper amounts of fuel, metallics, flux and oxygen (air).

In the trial and error method of operating a cupola (48-in.) we might suggest trying a 2000-lb metal charge, a 300-lb intermediate coke charge and 80-lb of limestone (flux). The chances are about one in a thousand that an optimum melting performance will result. On the other hand, we might say: This cupola has a hearth area of 12.6 sq ft and the proper amount of coke for the intermediate coke charge might well be 7½ lb per sq ft (or any figure from 5 to 10, inclusive). This would figure out to be a 95-lb coke charge. Our second problem, *not our first problem*, would then be one of determining the size of the metal charge.

The trial and error method of determining the weight of the metal charge would be to say: Let's try an 8 or 10 to 1 metal to fuel ratio, and multiplying the 95 lb coke charge by 8 or 10 we would decide whether the metal charge should be 760 or 950 lb. If the metal charge was made up entirely of pig iron and cast iron scrap, little or no carbon from the coke would be dissolved by the iron, but if the metal charge contained steel scrap, depending on the amount of steel scrap, considerable carbon may be dissolved by the metal charge. The amount of coke involved can be determined from the formula: Total carbon in metal tapped from the cupola equals 2.85 plus ½ (carbon in the charge minus 2.00).

Actually this formula presumes good melting procedures to be employed when the least possible amount of carbon is dissolved. That is, we can determine whether 5 or 10 or 20 lb of the 95-lb coke charge is going to be dissolved in the metal, leaving 90, 85 or 75 lb to react with oxygen and generate heat. There are about 12,500 heat units in a pound of good quality coke. There are about 600 heat units in a pound of iron at 2850° F, and in good melting practice up to 65 per cent of the heat units in coke can be transferred to the metal.

Finally, the proper sizes of materials must be used for optimum melting performance. Pieces of coke for small cupolas might well weigh about ½-lb per piece and coke for even the largest of cupolas might well not exceed 2 lb. per piece. Prewar, many pieces in a coke pile weighed more than 10 lb. and one time I found a piece that weighed 35 lb.

The pig iron producer has recognized the importance of proper sizing in some degree. Not many years ago all merchant pig iron for foundry use was sand cast and the runners were likely to be quite long and heavy. Then came machine cast pig iron with pigs weighing 100 to 120 lb each and measuring up to 24 in. long. Later, machine cast pigs have weighed 40 to 50 lb each with 20 to 22 in. of length. More recently the 10-lb piglets, in regular and silvery analyses, continued the trend of the pig iron producer to package its product in a form that would assist the foundry melting department to achieve an optimum melting operation.

Greatest deviation in the trend toward proper sizing of materials for the cupola metal charge is in the foundry's own revert material (runner box metal, risers, scrap castings, pigged metal, etc.), and in purchased scrap. Foundries making heavy section work, or large work, or white iron, have a much greater sizing problem than foundries making small, light sectioned gray iron castings.

Cut Down Runner Basin

For example, how often is a runner box designed in cross-sectional area and length with the thought that any metal which later freezes in the runner box becomes foundry revert, and if it cannot be broken up, will become oversize material when it gets back into a cupola metal charge?

If a riser has to be large in diameter and length, finally coming back to the cupola as oversize material, the riser could be redesigned so that it could be notched in one or two places. After it is broken this would make two or three pieces of much better size for the cupola charge.

Whether a foundry is making light-sectioned small gray iron work or heavy-sectioned large work, both accumulate waste metal from their melting operations. For example, if a couple hundred pounds of metal runs through the slag hole, it freezes into a piece of irregular shape and thickness. Why, when wasted metal in this form is salvaged, does it get into the cupola on the first charges where it can do the greatest amount of harm, rather than on the last few charges where it will do the least harm? There are two reasons why this occurs; one is because the foundry worker is embarrassed by this evidence of sloppiness in the

(*Concluded on page* 188)

Meeting Calendar

March 1-5—American Society for Testing Materials, Committee Week, Washington.
March 11-12—Ohio Regional Foundry Conference, Case Institute of Technology, Cleveland.
March 18-19—Magnesium Association, annual meeting, New York.
April 5-8—Southern Machinery and Metals Exposition, Atlanta.
April 5-8—National Association of Corrosion Engineers, annual conference and exposition, St. Louis.
April 12-14—Open Hearth Steel Committee and Coke Oven, Blast Furnace and Raw Materials Committee, AIME, annual conference, Pittsburgh.
May 3-7—American Foundrymen's Association, annual convention and Foundry Show, Philadelphia.
June 3-5—Steel Founders' Society of America, Technical and Operating Conference, Cleveland.
June 10-11—Malleable Founders' Society, annual meeting, Hot Springs, Va.
June 21-25—American Society for Testing Materials, annual meeting, Atlantic City.
Oct. 14-15—Foundry Equipment Manufacturers Association, annual meeting, White Sulphur Springs, W. Va.
Oct. 25-29—National Metal Congress and Exposition, Philadelphia.

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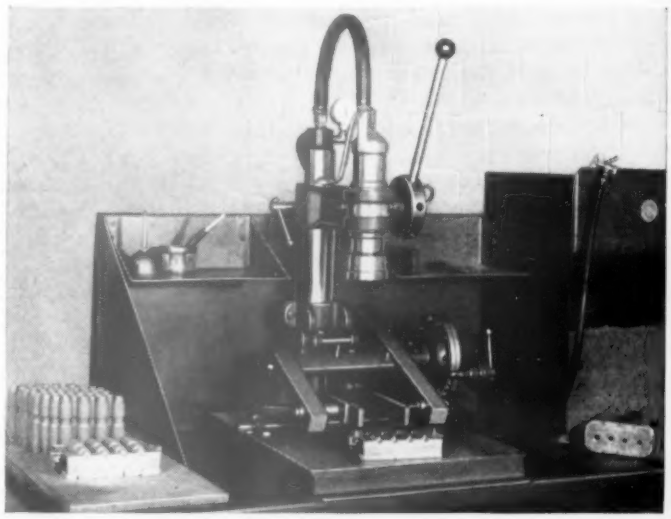

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(*Concluded from page* 186)

manufacturing process and feels better when the evidence is disposed of promptly; and the other is the false impression that there is so much excess heat available in any coke bed that the cupola can accept more irregularity on the first or first two charges than during any other part of the heat. Many can remember, or some may still continue with the practice of putting twice as much metal on the first charge as on any other charge.

My analysis for many years of "performance" in the melting department of the gray iron foundry industry has been made from the several viewpoints of raw materials, know-how or skill, quality of product produced, economics and facilities. Today these factors are more critical than ever before in the industry's history. It is my belief that the raw materials situation will become increasingly critical in the months ahead, and it may be a long, long time before unlimited quantities of high quality materials again become available.

Industry Is Complex

It should be realized that the gray iron foundry industry is part of a highly complex industrialized society, and today, with world affairs out of balance, we note clearly how the industry is affected by the adjustments which are taking place in this society. Then we must understand the dominant position of the United States in accounting for more than one-half the world production of iron and steel.

As of Jan. 1, 1947, annual capacity of the 232 blast furnaces in this country was 67,709,200 tons. U. S. production of pig iron was 59 million tons, of which 5⅛ million tons was foundry and malleable grades. The steel industry produced 85 million ingot tons of steel; gray iron foundries produced 12½ million tons of castings, and steel and malleable iron foundries produced another 2½ million tons of ferrous castings.

If we had one more, or ten more, blast furnaces in this country, it would not necessarily mean more pig iron would become available. Current inventories of iron ore at blast furnaces are likely to become dangerously low, at least in some blast furnace areas or for specific grades of ore, before the next navigation season begins. However, if we could get iron ore, we still might not be able to operate one more, or ten more, blast furnaces as coke might prove another bottle-neck. In 1947 the U. S. produced about 65¾ million tons of by-products (now called "oven") and 6½ million tons of beehive coke. This was close to 15 million more tons in 1947 than in 1946.

Consideration also should be given to probable effects of the European Recovery Program (Marshall Plan) now before Congress, which the State Department wishes to become effective in April 1948 and to continue four years. In certain discussions it has been stated that, of the commodities to be exported under this plan, the two which will hurt the most are wheat and steel. I would like to caution that in recent years the term "steel" has frequently been used in a broad sense to include steel, gray iron, malleable iron, pig iron and scrap. On Jan. 15,

General Marshall, in discussing this plan before the Pittsburgh Chamber of Commerce, stated that although the volume of exports contemplated in the first 15 months of the program would be less than the volume of the last 15 months, we should anticipate less inflow and increased outflow of steel, gray iron, malleable iron, pig iron and scrap.

As 1937 was a reasonably good business year, and also a peacetime year, we might take a brief look at the record. The steel industry produced 56.6 million ingot tons of steel and the gray iron foundry industry produced 8½ (estimated) million tons of castings. Pig iron exports totaled 876,328 tons and 125,104 tons were imported, an outflow of 751,224 tons. Scrap exports were 4,593,735 tons and 91,441 tons were imported, an outflow of 4,502,294 tons. Our total exports of pig iron, scrap, semi-finished and finished steel products, including gray iron, malleable iron, etc., were 8,508,658 tons, and imports were 600,505 tons, an outflow of 7,908,153 tons. We imported 3,756,466 tons of iron and manganese ores and exported 1,415,794 tons of iron ore, an inflow of 2,340,672 tons.

During the war years of 1942, 1943, 1944 and 1945, the net outflow of pig iron ranged between 70,000 and 155,000 tons per year, while the total outflow of scrap for these four years was only 1589 tons.

The net balance between exports and imports for pig iron, scrap, semi-finished and steel products, including gray iron, malleable iron, etc., for the four war years represented an outflow of 7,296,972 tons in 1942; 7,161,837 tons in 1943; 6,055,526 tons in 1944, and figures for 1946 were 5,079,322 tons; and for 1947, probably in excess of 7 million tons.

Pig Iron Imports Are Low

It is wishful thinking to expect any real help from imported pig iron, except possibly in an isolated case or in trading finished products for pig iron—ton for ton. The first ten months of 1947 we exported 23,728 tons of pig iron, an annual rate of 28,473 tons. In the first nine months, we imported 24,998 tons, an annual rate of 33,331 tons. This is a net inflow of only 5000 tons, although final figures for the year may show that we exported more pig iron than we received. Most of our imports the first nine months were from Britain (8407 tons), Poland (7466 tons), Norway (3958 tons) and Holland (2621 tons). Principal exports in this period were to Canada (6348 tons) and Belgium (8209 tons).

One of my friends who has been associated with the coal and coke industries for a lifetime says, "Even good mines are now producing poor coal." Although it is possible to beneficiate poor coals to higher quality, it requires equipment, will mean additional cost, and will take time before the mines have this equipment in operation. The foundry coke producer has his problems too. One producer who marketed an excellent grade of foundry coke before the war, receiving his coal supplies from three mines, now is supplied with coal from 13 mines.

Speaking before the Gray Iron Founders' Society's annual meeting (see THE FOUNDRY December, 1947, p. 82), E. C. Barringer, executive secretary, Institue of Scrap Iron & Steel, pointed to the serious drain in both the visible and invisible reservoir of scrap in this country the last two decades. He said that 20 million tons of scrap was exported between 1930 and 1940, and that an additional 140 million tons have been irretrievably lost or locked up in surplus inventory during the World War II years.

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MORE AND MORE FOUNDRIES ARE SWITCHING TO VELSICOL!

Many foundries have switched to VELSICOL, for this Core Oil develops the highest strength to gas evolution ratio of any core oil. VELSICOL Core Oil produces a smaller amount of gas and consequently gives a smooth and clean casting finish.

So for unexcelled workability in your core boxes, high binding strength, lowest gas-evolution and maximum economy in the production of high grade castings in steel, gray-iron, malleable or non-ferrous metals, switch to VELSICOL Core Oil!

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The adventures of BILL

By PAT DWYER

Drawings by RICHEY

AT LUNCHEON time one day last week I sat so close to a judge—in fact, to two judges—that I could have stuck a pin in either one. Certainly I had no intention of taking this trifling liberty, but somehow I got a spiritual lift from even a mild contemplation of the general idea. The greater part of a lifetime lay between this last and my first contact with one of these awesome creatures. I did not go around shouting my sentiments from the house tops, but my feelings paralleled closely the views held by the late Mr. Kipling's character who solemnly warned one and all of the Widow at Windsor. "Walk wide o' the Widow at Windsor, for 'alf o' creation she owns. . . . For the Kings must come down and the Emperors frown when the Widow at Windsor says 'Stop!' "

The first and only time I was brought before a judge was in the summer of my eleventh year. Complying with the more or less earnest and shocked protests of a few old ladies, the town lone policeman strolled down to the river bank, sat on our scanty clothes and promptly arrested three hardened young barbarians when we climbed out of the water. He marched us up to the judge's office and charged us with the high crime or misdemeanor of swimming and diving from a spring board while the daily passenger and freight steamer was passing.

To our great astonishment we learned that our crime was not the act of swimming in the river at any special time, but was based directly on the fact that our little innocent and sun-tanned hides were not protected or concealed by a single rag or stitch of clothing. Word of the incident, also a highly exaggerated account of the judge's threat to put us away in a penal institution for a period of six months, leaked out. For the remainder of the summer, at every camp fire and spring board along both sides of the broad, tidal river, we enjoyed our first flattering touch of notoriety. Approximately in the same proportion the judge sank in the estimation of groups of boys accustomed for years to frolic in the water like so many seals.

Last night when Bill came in I touched upon this incident. I leaned with particular emphasis on the way the judge's solemn performance affected my little impressionable mind at the time and for years afterward. Bill dismissed the story as worthy of little or no comment.

"Very singular," he said, "that you should wind up and run out a record today about judges. One day last week, Friday or Saturday—I forget which — 'twas near the end of the week anyway—I had a letter from a lad who probably has been up before more judges than any other man of his age and weight in the country. Listen:

" 'Deer Bill: One of these days when my soshal sekitary gets through with the income form, I must have her check over my proposed itinerary for the spring and summer and see if it will allow me to take a short gander through Cleveland some time in March, where I see by the papers you fellas are puttin' on a foundry conference. I ain't been to one of them things for quite a spell and I am kinda curious to see what kind of problem bones the boys are nawin' on lately.' "

"If I have the required recognition and permission from the chair," I interrupted, "I should like to rise to a point of order."

"A point of order, hey?" Bill purred sweetly. "Was I reading the thing too fast for the brother's receiving set, or did the worthy brother neglect to have the long ears rebored and rebushed recently?"

"The receiving set is in good working order and quite capable of catching faster pitching than your's. With a constant stream of drivel shooting in one ear and out through the other, the passage is scoured clean and there is no need for a trip to the repair shop for insertion of new tubes. The point on which I crave a little light is where did your free spelling friend find the word 'itinerary' and even more astonishing, if that is possible, how does it happen that he spells this fairly difficult word correctly?"

"A most remarkable and I am sure,

(*Continued on page* 192)

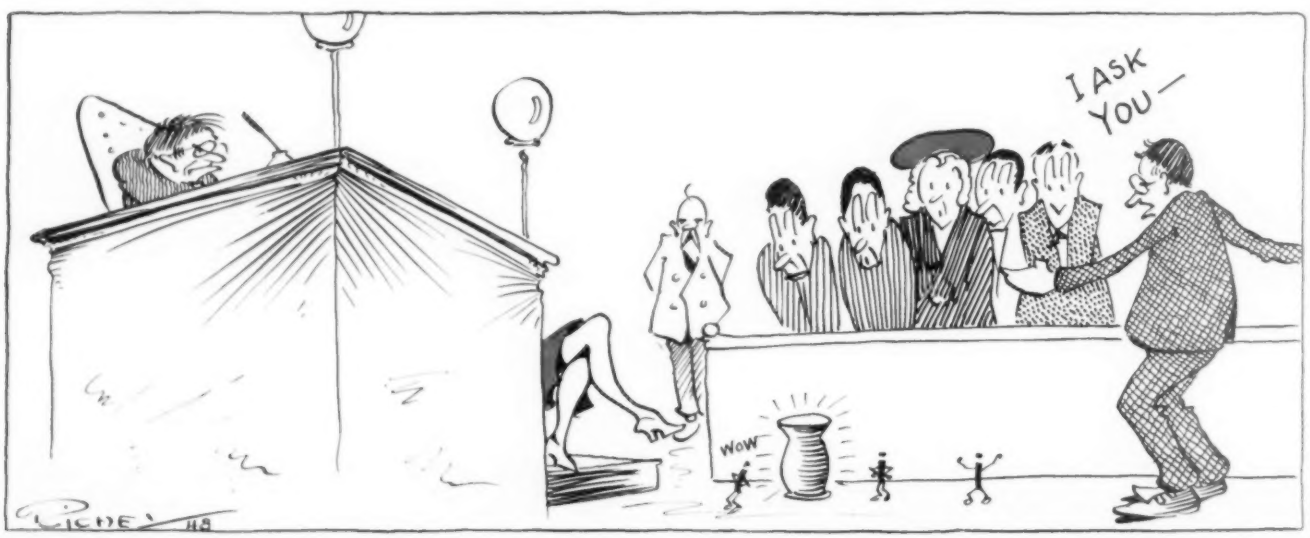
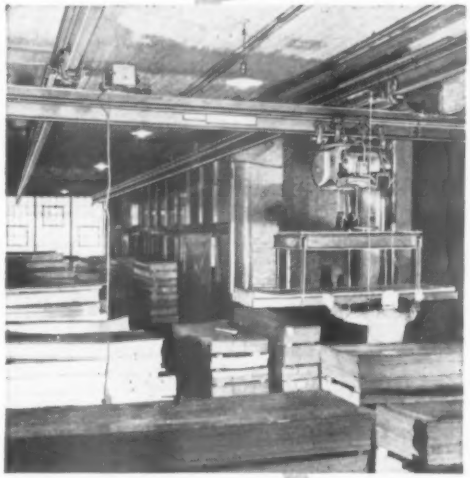
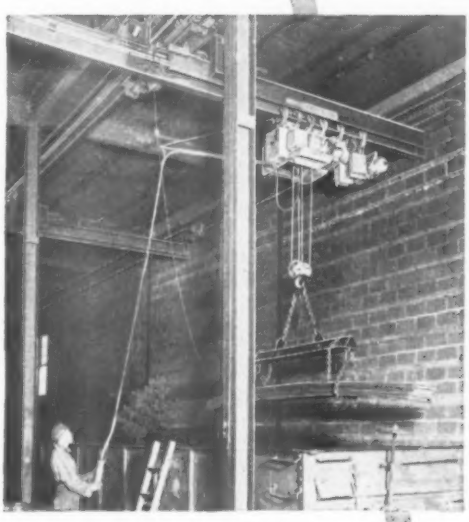


Exhibit A, center, slightly deflated or collapsed, appears to be the most important factor in the trial

5-Ton Low Headroom MONORAIL CRANES





AMERICAN MONORAIL 5-Ton Cranes furnish efficient operation where headroom is a critical problem. Twin-bridges with carrier mounted between bridges bring load clearance to uppermost limit for extreme low headroom operation. American MonoRail Low Headroom Cranes operate by cab or from floor by finger-tip control. Interlocking devices permit carrier to travel beyond craneways. Loads are moved over maximum area, every square foot of operating and storage space is served. Cranes can be installed under present operating conditions without excessive structural changes.

An American MonoRail Engineer will be glad to discuss the possibilities of crane operation in low headroom areas regardless of the type of handling.

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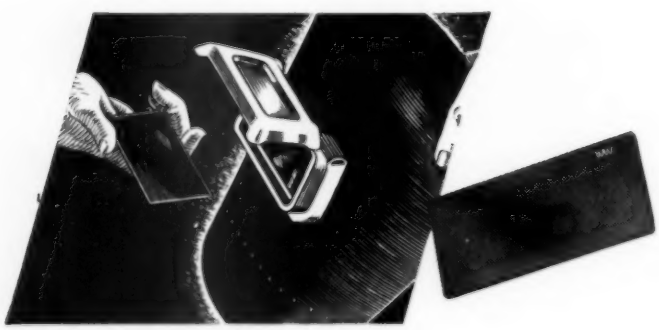

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(*Continued from page* 190)

a highly interesting question," Bill admitted. "I might answer it by pointing out that the word, properly spelled and accented, may be found practically in all dictionaries. So far as I know there is nothing, except sheer laziness, to prevent any free and independent citizen from taking a peep at the pages occasionally. However, and here is the fly in the ointment, the crack in the lute, the worm in the apple, I do not think Eddie's curiosity ever was strong enough to lead him into or through the pages of a dictionary, or any other book. Like these nimble finger birds who whang out horrible sound combinations from any kind of musical instrument from jewsharp to piano, he spells by ear and not by note.

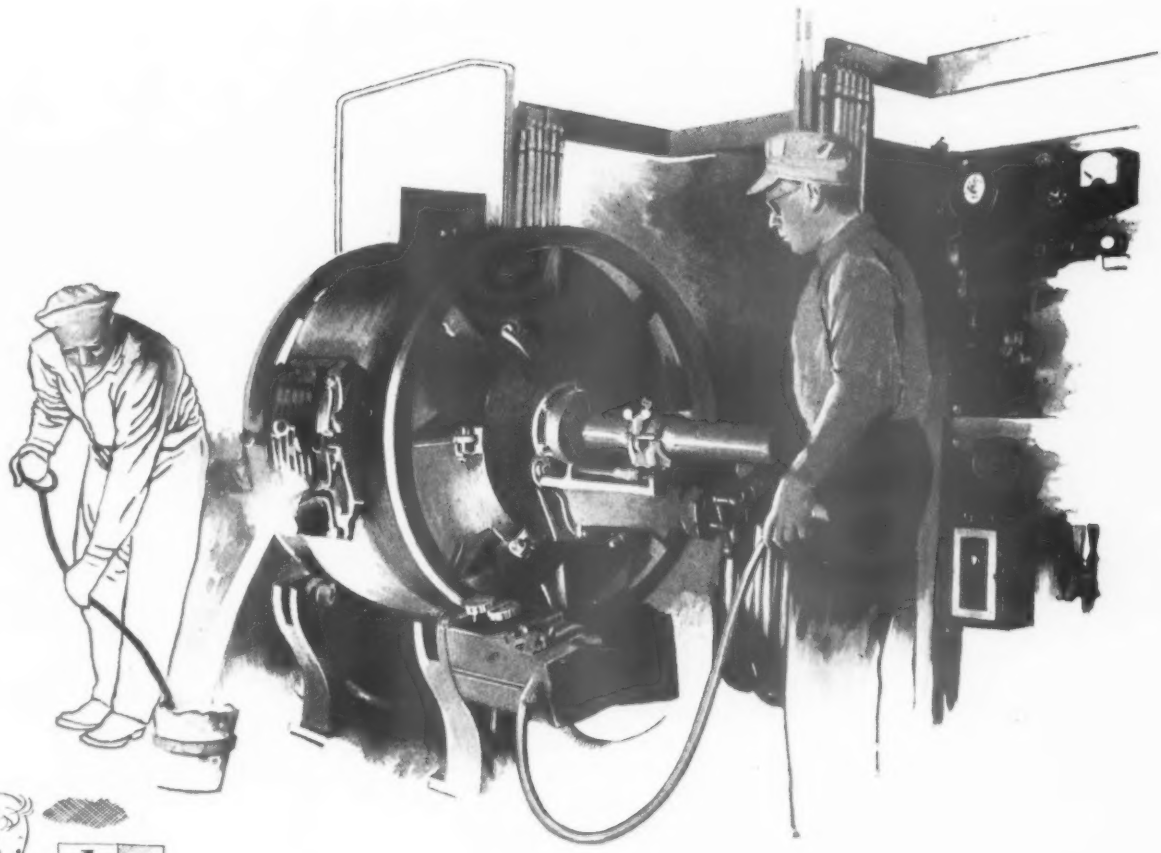
"In this particular instance I happen to know that many years ago he read the word in one of Johnny Serrigan's interesting, sensible and scholarly letters to the editor of the *Molders' Journal* in Cincinnati, over the signature 'A Hobo Yes.' Eddie was so fascinated by the word—especially after he learned the meaning—that he used it on every possible occasion afterward. Which reminds me I knew a fella one time—Red Mike McNulty—or just plain Red—who had the same trick of working in the word 'academic.' He thought it had something to do with a high school or a young college or something, and therefore added a bit of tone to his otherwise rather drab and pitifully meager vocabulary. He sprung it on a beery gent one night in the old Germania Hall—"

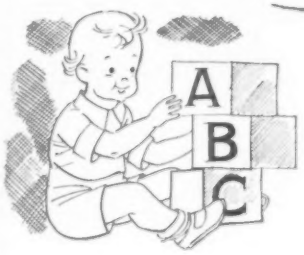
"The beery gent probably dropped dead, or maybe he just staggered through the door, a course of action I am inclined to follow if every simple question I ask brings a reply as long and involved as the tail of a kite, or a notice from some alphabetical bureau that as and of a date six months old your rent is to be raised another $16.50 per month."

"Little boys," Bill wagged an admonitory finger. "Little boys should not play with edged tools. Some wise old gink ahead of me thought of that, but it is still good. In four simple words I can tell you how to avoid brain fag, that tired feeling, and the general sensation of spinning around like a squirrel in a cage."

"Now," I exclaimed, "in the new and improved type of language, pushed along by the newspaper comics, the vanguard and bulwark of our civilization, the most widely read of all features; now for sure you are cookin' with gas on all four burners!"

(*Continued on page* 194)





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Detroit Electric Furnaces occupy minimum floor space. They operate cleanly and are economical in power consumption. Many models are designed for quick change of shells.

Available in various models with capacities ranging from 10 pounds to 8000 pounds. Send us details of your melting problems and *we can show you how* a Detroit Electric Furnace will *speed production and lower costs* in your operation.

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The check list (at right) indicates some of the many compressed air jobs to be done, all of which are accomplished easily, quickly and economically with Schramm Air Compressors.

Here's *why* you profit, as others have, by using Schramm: they're compact, lightweight, easy to start; built for rugged jobs, to provide a continuous flow of air.

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- Operating Air Hoists

SCHRAMM INC.

THE COMPRESSOR PEOPLE • WEST CHESTER • PENNSYLVANIA

(*Continued from page* 192)

Pray, spill the four precious words.

"Don't ask any questions!"

After allowing the proper radio interval of 65 seconds for this distilled essence of wisdom based on experience to soak in, Bill continued.

"Le's see. Where was I in Eddie's letter when you threw a sprag in the wheel of progress and brought the smoothly moving train to a more or less screeching stop. Ah, yes. Here she is. If he can arrange his itinerary he might spend a day or two in Cleveland. He is kinda curious to see what kind of problems are on the agenda, or as he puts it rather neatly 'What

Tempter always is on the job

kinda problem bones the boys are nawin' on lately.'

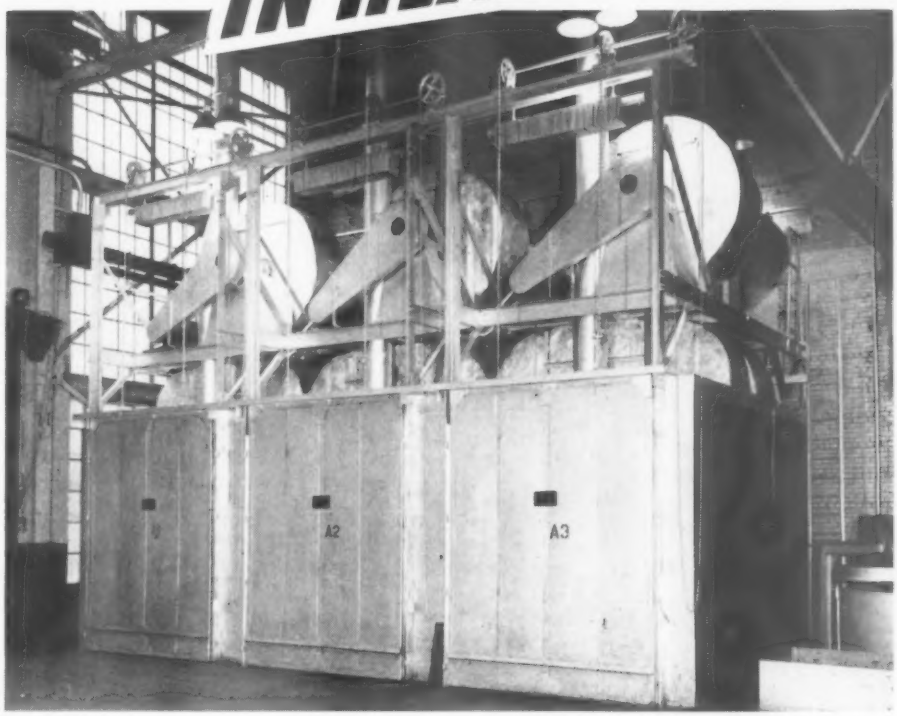
"I shall clip the advance program as it appeared in a recent issue of THE FOUNDRY and send it to him. After he has studied it diligently he will be in a better position to decide whether or not to place a cross in front of Cleveland in the list of places he intends to favor.

"This itinerary business has me kinda stopped. Seems to me to indicate a definite trend toward the left, a falling away from the sturdy, independent spirit, the habits and customs of the knights of the open road in the so-called good old days when the foreman was the high justice, the middle and the low, who hired and fired as the spirit moved, and the average wage was $2.50 a day.

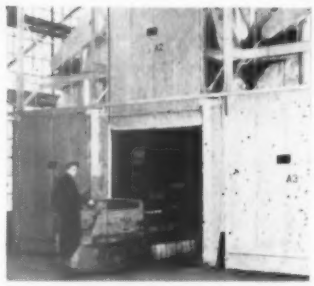
"In those days the word 'itinerary' was unknown. The idea of preparing one never entered the head of a prospective tourist. He quit the job for any one of fifty reasons. More frequently for no apparent reason. With all his worldly possessions on his back, a trowel and double ender in

(*Continued on page* 196)

A NEW PRINCIPLE IN HEAT PROCESSING



Another CARL-MAYER Engineering Achievement



By use of an entirely new principle of heat circulation (patents pending) on these three new "super" ovens, designed and built for a large aluminum company, heating speeds and temperature uniformities never before achieved in similar equipment have been made possible.

Many modern developments in core and mold oven practice were pioneered by Carl-Mayer, including such important ones as—

√ **THE STEEL INSULATED OVEN** which has displaced the old style brick oven. Many of the older foundrymen (and competition) will remember Carl Mayer's early crusading as manager of Swartwout oven division.

√ **THE SLOTTED PANEL JOINT** (pat. no. 1843430) which revolutionized steel insulated panel ovens due to minimizing heat losses. This construction eliminated the brick oven of the old days by its adaptability to any type oven.

√ **RECIRCULATING HEATING** for shelf, rack, drawer and car type ovens.

√ **CARL-MAYER PATENTED** (pat. no. 2257180) **RECIRCULATING HEATING SYSTEM FOR VERTICAL OVENS.** The importance of this patented feature is evidenced by attempts to copy the design.

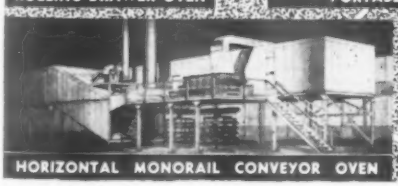
OVER 28 YEARS' EXPERIENCE—
SERVING LEADING FOUNDRIES

ROLLING DRAWER OVEN

PORTABLE RACK OVEN

VERTICAL OVEN

CAR TYPE OVEN


HORIZONTAL MONORAIL CONVEYOR OVEN

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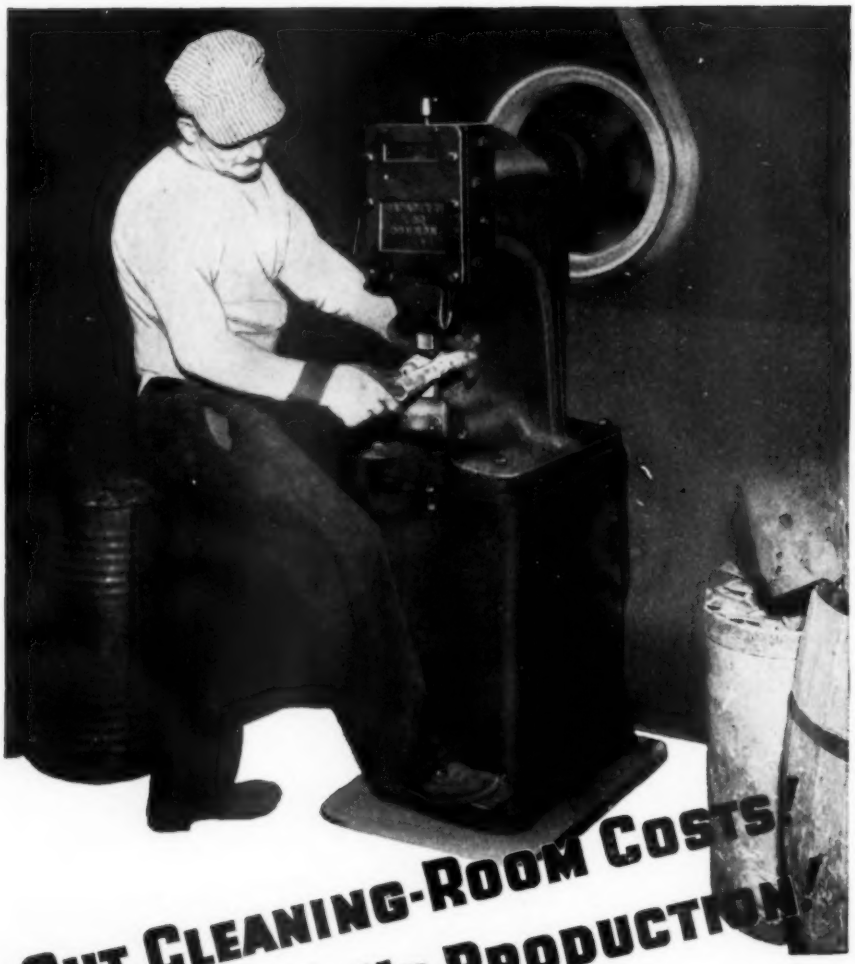
CORE AND MOLD OVENS



CUT CLEANING-ROOM COSTS STEP-UP PRODUCTION

with the Milwaukee-Tessmer Sprue Cutter . . .

MODEL H — with Built-in Motor Drive and Speed Reducer.

Cutting sprues and gates on non-ferrous castings becomes a one-man operation with this machine. What's more, a skilled operator isn't needed. Any workman can learn to run the Milwaukee at top capacity in a short time.

It results in a fast, steady flow of work through the cleaning department; accumulations of unfinished work are eliminated, less storage space is required because castings are trimmed and cleaned as they come from the foundry.

With the Milwaukee, ONE SWIFT, SURE STROKE clips gates or sprues in a matter of seconds; slow, tedious hand labor is eliminated, manpower released for more important work.

All models of the Milwaukee-Tessmer Sprue Cutter are fully described in a New Illustrated Bulletin. Write for your copy.

Milwaukee

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(*Continued from page* 194)

one hip pocket, a paper of Polar Bear in the other, card and due book pinned to the inside lining of the flannel or fleece lined undershirt, he waited until the shades of evening fell. Then he tripped or stumbled down to the freight yard or the water tank where No. 6 always stopped for a drenching. He hopped the first train that came along without a single thought whether it was going north, south, east or west. He was on his way and happy. Depending on the vigilance of the brakemen, he left the train voluntarily or involuntarily with the same open mind. He did not know where he was going when he started. He did not know where he was when he landed. Frequently he did not know where he had been at any given period of his existence. I think my old pal Eddie is talking a bit sarcastic when he drags in this itinerary stuff."

"Perhaps," I suggested mildly, "if you were to read the remainder of the letter you might discover the key to the cryptogram."

"This ain't no cripto — whatever you said it was—just a plain straight forward message from one of the old boys, more accustomed to the feel of a shovel handle than a pen or pencil between his fingers. At a conservative estimate I should say that Eddie twisted and groaned for the better part of two hours composing this epistle on one sheet of ruled paper snitched from some kid's scratch pad. Needless to say he never owned or carried a brief case containing a selection of stationery. Between sentences he moistened the pencil liberally in the—ah—usual manner, and during the more difficult passages he chewed the upper part of the pencil until it resembled the skeletonized back bone of one of the smaller rodents. He could knock out a floor of molds in less time than it takes him to write a letter. As a work of art it never would take a prize, and certainly if it was done in one of the old time school houses, it would not be displayed on the blackboard. However, it represents considerable time, also more or less severe physical and mental effort, and for that reason I prize it highly. Old Eddie is all right.

" 'Well Bill' he says, 'I been thinking some time of withdrawing all my patronage from the railroads. Now that times are good again the railroad yards are full of Dicks and the brakemen on the trains shove you around and off the platforms and other places without even a single look where you are going to land. I wrote to the presidents of two of the main lines going through here, but

(*Concluded on page* 198)

FABREEKA

UNDER SHAKEOUT MACHINES JOLT MOULDERS AND OTHER HEAVY MACHINERY

FABREEKA has demonstrated its ability to increase production efficiency and reduce the costs of maintenance by absorbing the effects of heavy impact shock and destructive vibration under such heavy machinery as shakeout machines, jolt moulders, forging hammers, grinders, stamping machines and many others.

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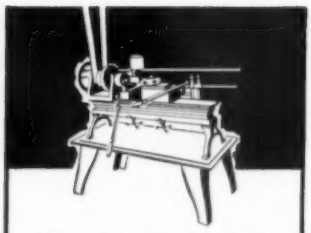

The first successful turret lathe and the first Roots Blower were built in the same year . . . 1854. We're not good because we're old, but old because we're good.

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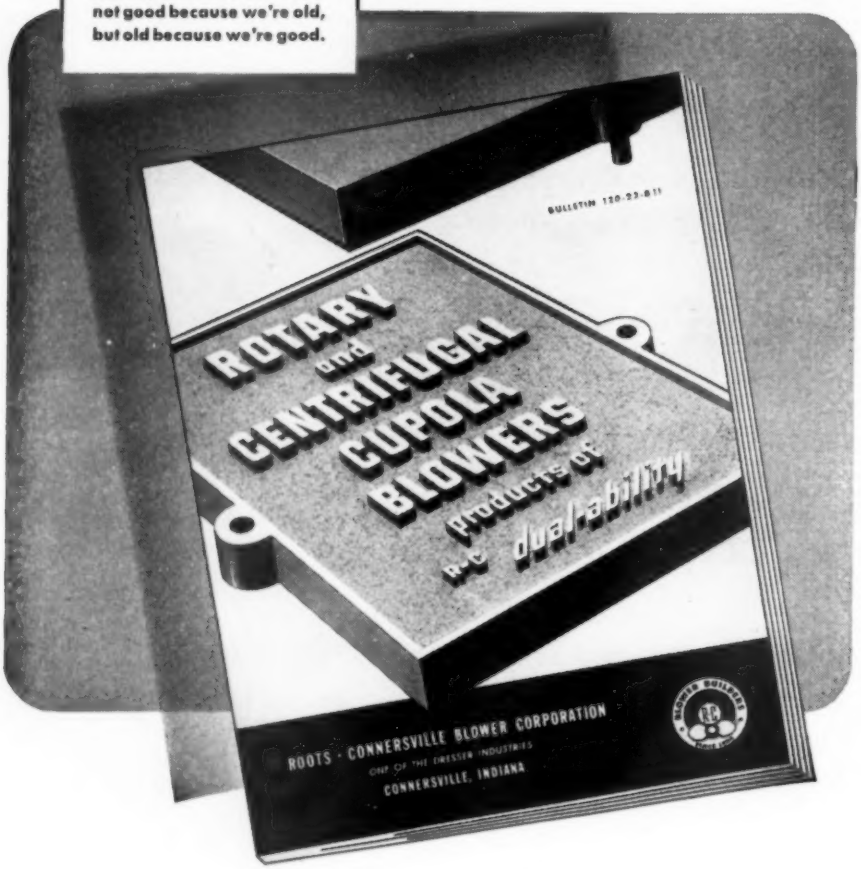

If you have not already received this new bulletin on Roots-Connersville Blowers for foundry cupolas, your copy is waiting for you, without charge.

You'll find useful tables for selecting blowers and other valuable information—as well as proof of our *dual-ability* to deliver complete satisfaction in either Centrifugal or Rotary Positive equipment, whichever is best suited to your requirements.

Ask for Bulletin 120-23-B11.

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★ ★ ONE OF THE DRESSER INDUSTRIES ★ ★

(*Concluded from page* 196)

the cowards never answered my reasonable complaint. So, as I say Bill, I'll leave 'em flat and hitch hike my way on the broad highway. I've taken three or four practice flights already and it worked out all right.

"'March is a little early to be heading north, but nearly all the cars have heaters in 'em and besides they are all closed in nice and cosy. Away ahead of the brake rods, the roofs, or the platform on the blind baggage, I'll make out all right. In your town I'm pretty sure to ketch a job in the City, or Kilby's, or at Bowlers or the Fulton. I'm sick of this dump anyway. About a month ago I has a run in with a guy who talked too free and frequent. I gives him the old one-two and next day a bandy leg judge with a goat beard gave me 30 days with the road gang. When I get out of here I'll go so far and so fast it'll take $2.50 to send me a post card.'

"Tough babies, them judges," Bill commented, as he filed away the precious document. "Walk wide o' the Widow, hey? 'Tisn't a bad idea to give them judge fellas the middle of the road."

MULTIPLE MOLDING CAN INCREASE PRODUCTION

(*Continued from page* 69)

suffice to ram the cope. The frame then is struck off, removed, and the mold at this stage appears as in Fig. 6, with 1 in. of sand projecting above the flask. The machine head is brought forward, and a turn of the levers automatically raises the table to squeeze mold the drag. This 1-in. head of sand in which the drag is molded has been determined with such nicety that practically no sand is ejected from around the edge of the flask, but at the same time a smooth, flat top mold surface is provided.

The molding machine pictured in Fig. 6 is the pin strip type, consequently by the time the table has been lowered and the head tilted back, the mold has been drawn from the cope or lower pattern, as shown in Fig. 7, and is ready to be lifted off the machine. This provides a somewhat faster cycle than that afforded by the machine in Fig. 2 which employs a vibrator in drawing the pattern. Both this illustration and Fig. 8 show finished molds ready to be placed on a stack. The equipment shown in Fig. 8 will produce 14 castings — hexagonal caps — per mold, or 126 per complete stack. That shown in Fig. 2 will provide 32 similar but smaller castings per mold, or 288 per stack. Each mold

(*Concluded on page* 200)

A tonic that's good for castings

CASTINGS ARE NO BETTER THAN THE METAL THEY'RE MADE FROM. In ordinary foundry practice there is but little relief from slag and other impurities in molten metal.

IT WILL PAY YOU TO CHECK YOUR PRODUCTION. Then ask us to show how you can obtain better and sounder castings, avoid make-overs, save machining time and please your customers with an unusual product, by using Famous Cornell Cupola Flux (metal cleanser) in every charge of iron.

A RECOGNIZED NECESSITY. Leading foundries have used it regularly for years—to purge their metal of impurities.

MADE IN SCORED BRICK FORM, it enables you to flux a charge of iron correctly in a few seconds. Under average conditions you simply toss one brick into cupola for each ton charge of iron or break off a briquette (quarter section) for each 500 lb. charge. *Another advantage* of flux in brick form is that waste is eliminated and fullest efficiency is assured, because it does not blow out with the blast but stays in melting zone until entirely consumed.

Write for Bulletin 46-B

MAKES METAL FREER FLOWING

MAKES CASTINGS SOUNDER, MACHINING EASIER

AIDS GREATLY IN REDUCING SULPHUR

KEEPS CUPOLAS CLEANER

Prevents bridging over to a great extent, cuts maintenance time and labor.

The CLEVELAND FLUX *Company*

1026-1036 MAIN AVENUE, N. W., CLEVELAND 13, OHIO

Manufacturers of Iron, Brass and Aluminum Fluxes Since 1918

FAMOUS CORNELL FLUXES
Trade Mark Registered

Write for Bulletins

Famous CORNELL ALUMINUM FLUX	*Famous* CORNELL BRASS FLUX	*Famous* CORNELL LADLE FLUX
Produces clean, tough castings. No spongy or porous spots even when more scrap is used. Thinner yet stronger sections are poured. Castings take a higher polish. NO FUMES! Exclusive formula prevents obnoxious gases. Metal does not cling to dross.	Makes metal pure and clean, even when dirtiest brass turnings or sweepings are used. Produces castings which withstand high pressure tests and take a beautiful finish. Saves considerable tin and other expensive metals. Crucible and furnace linings are preserved.	Place a few ounces in bottom of ladle, then tap cupola. Metal is thoroughly cleansed, foreign impurities are easily skimmed off. Ladles are kept clean, there is less patching and increased ladle life. Metal temperatures are retained during transfer to molds.

(*Concluded from page* 198)
weighs about 30 lb.

Adjoining flasks in a stack do not touch each other, since they are purposely rammed to prevent sand-to-sand contact. This, of course, is necessary to prevent runouts in pouring, and to help the escape of gas, but it is one of the numerous factors to be considered in setting up a job of this type.

Each stack of molds is well weighted prior to pouring. This is accomplished by a thick metal plate — which completely covers the top of the stack—and two additional hand weights, as shown in Fig. 1. This total weight of more than 200 lb is dictated by the fact the poured molds contain an unusually large amount of metal in relation to total flask volume, with a corresponding increase in gas pressure. Air furnace metal is transported in 500-lb capacity covered ladles over a monorail to the molds for pouring. A basin is placed over a hole in the weight plate to facilitate pouring, which is done as rapidly as the metal will flow through the sprue.

As will be noted from the illustrations, flasks now are set out on the floor for pouring, and sand is shoveled into the flask by hand from the floor. Because both of these operations take up considerable of the machine operator's time and effort, the company is installing a central sand preparation unit with a belt conveyor leading to hoppers over each molding machine, and mold roller conveyors adjoining the machines.

It was mentioned previously that production recently had been at about 500 molds per machine per day. This figure was reached despite the fact molding time was not continuous, being interrupted by delays in sand preparation and delivery and by the time spent in moving the molding machines as the floor was filled with molds. Under the planned setup, with the new sand and mold handling facilities and uninterrupted molding, it is estimated by E. B. Hansen, general manager, that production approaching 750 molds daily will be possible—approximately four times that of former practice.

Considerable experimental work was carried on by Wisconsin Appleton in determining the most satisfactory sand for its stack molding operations. The excessive heat from the large amount of hot metal evenly distributed throughout the stacked molds poses the principal problem and resulted in selection of a synthetic sand mixture. One sand mixture which has worked out successfully includes 40 per cent heap sand and the balance silica sand plus small additions of bentonite and seacoal. Another mixture is 80 per cent heap sand, 20 per cent Mississippi sand and a small seacoal addition. Moisture content is held around 3.5 per cent with permeability about 40.

Shaking out the stacked molds presents no particular problem. Practice at this plant is to pick up a complete stack by hoist and place it on a portable mechanical shakeout. Here it is held on the grate until the sand has loosened sufficiently to permit the flasks to be lifted as a unit free from the castings.

Gas Conference

American Gas Association will hold its annual sales conference on industrial and commercial gas in Windsor, Ont., Canada, Apr. 7, 8 and 9. The program includes a discussion of industrial gas subjects on the first day and discussion of subjects of general interest and the formal luncheon on the second day. The third day will be devoted to commercial gas subjects.

Metal Turning Made Easy with New Simplified Tool!

A new tool called "Tru-Turn" makes possible the conversion of drill presses, woodturning lathes, or grinder stands into tools that will turn and cut-off steel, bronze, copper and aluminum. The "Tru-Turn" tool shown above is mounted on a Buffalo Drill Press, Spindle Size.

The "Tru-Turn" tool is easy to operate and cuts and turns bar stock of steel, bronze, copper and aluminum measuring ¼", ⅜" and ½". Its built-in micrometer permits adjustments that give tool-room accuracy to 1/1000 inch.

Small tool shops as well as all types of repair shops and garages find the "Tru-Turn" ideal for cutting long pieces of bar stock into desired lengths. Also, home craftsmen are able to produce accurate, highly finished precisioned-machined parts from metal even without previous training.

Accurate, precision work is also easier to do when tension is relieved by chewing gum. The act of chewing gum seems to make the work go easier, faster—thus helping on-the-job efficiency. For these reasons Wrigley's Spearmint Chewing Gum is being made available more and more by plant owners everywhere.

Tru-Turn Tool

You can get complete information from Millholland Screw Products Corp., 132 West 13th Street Indianapolis 2, Ind.

AC-55

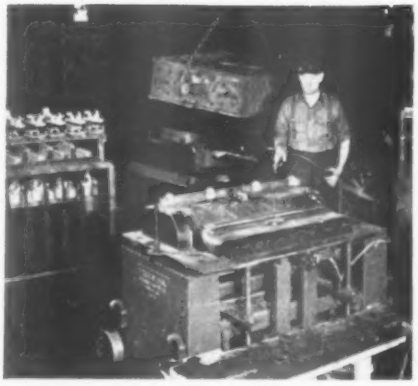
INTERNATIONALS

90 Standard Types
1400 Different Sizes

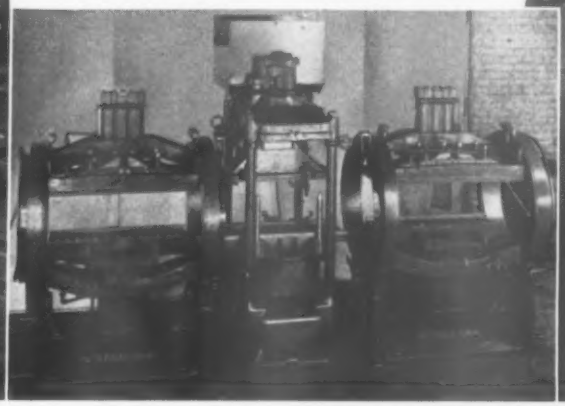
Many Special Designs
to meet
Special Requirements

Foundries in which
MAXIMUM PRODUCTIONS
are maintained are equipped
with

INTERNATIONALS



INTERNATIONAL
MOLDING MACHINE CO.
La Grange Park, Illinois



SELLS CASTINGS
And the Foundry Industry

When a foundry acquires a new name and a modern, enlarged plant, it has a job of selling itself both to customers and the community. Here is how a Michigan company proceeded—and indirectly gave a boost to the desirability of foundry work generally in its area

IN SEPTEMBER, 1946, Paul M. Wiener, a Muskegon, Mich., foundryman, realized that expansion of his company's facilities was necessary if customer requirements were to be met. Then, with extensive plant construction and improvements in prospect, the time also seemed right for important changes in the character of the business itself. The sweeping program that was adopted brought into existence within an extremely short period the Paul M. Wiener Foundry Co., an established foundry housed in a new plant, mechanized, operating under a new name and enjoying new stature in the community and with its workers. The new company completely replaced its predecessor, the Montague Castings Co.

Unique in the program was the fact that it was accomplished without interrupting scheduled production. The only way in which the new building could be erected without halting deliveries of castings was to build it over and around the existing foundry and then remove the old structure. How this was carried out will be discussed later.

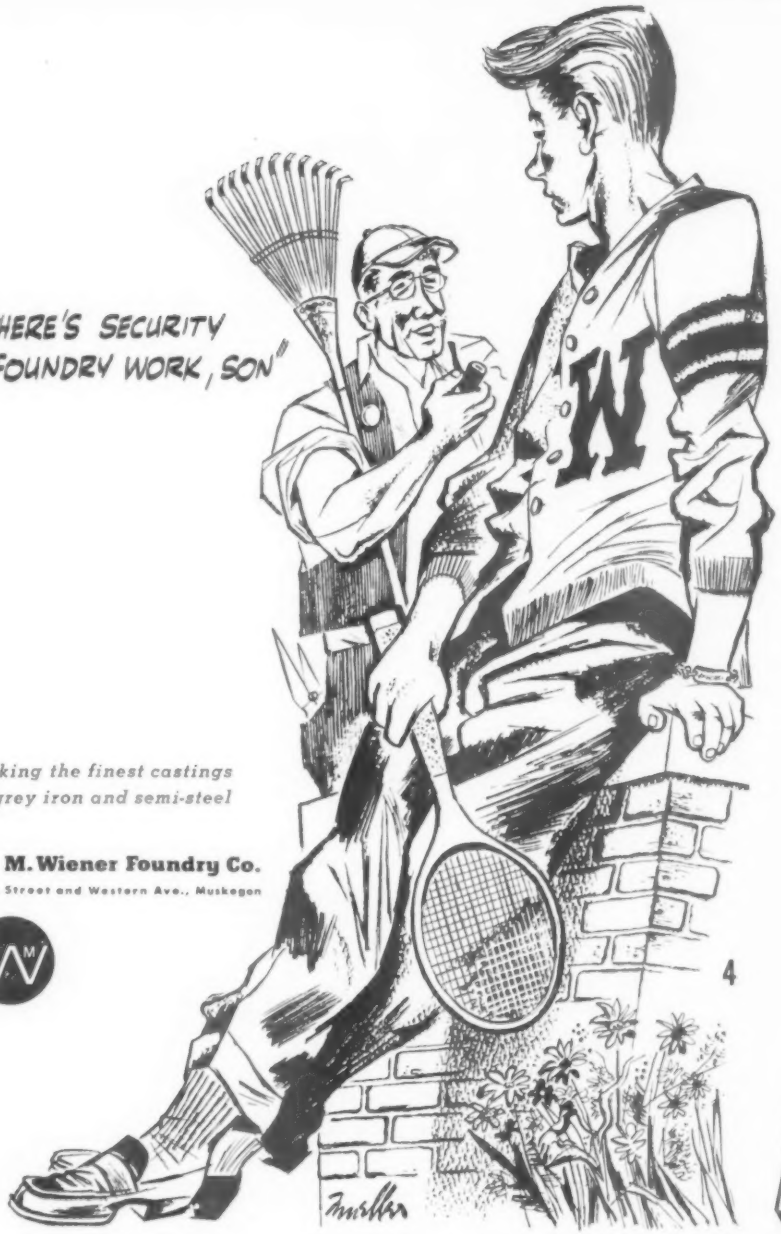
With the physical problems involved in building the new plant and installing modern equipment solved, the task remained of building public esteem for the new foundry under its new name. An intensive local public relations campaign was initiated for the company by Behel & Waldie & Briggs Inc., Chicago. Theme of the campaign was that "a modern foundry is a *good* place to work," and various media were used to bring the story of the new plant and change in name to the community. (*Please turn to page* 204)

1
PAPA, MAMA, AND THE LITTLE ONES
Paul M. Wiener Foundry Co.
MUSKEGON, MICHIGAN
HIGHEST QUALITY GREY IRON AND SEMI-STEEL CASTINGS

Figs. 1 and 5—Typical advertisements directed to casting users in adjacent districts called attention to the company's product range

Fig. 2—New plant of the Paul M. Wiener Foundry Co., Muskegon, Mich., during construction. It was built around and over an old foundry

Figs. 3, 4 and 7 illustrate the type of newspaper advertisements employed in the company's local public relations campaign. Theme of the campaign was that "a modern foundry is a good place to work." Similar messages appeared on billboards (Fig. 6) in the local area


"THERE'S SECURITY IN FOUNDRY WORK, SON"
making the finest castings of grey iron and semi-steel
Paul M. Wiener Foundry Co.
10th Street and Western Ave., Muskegon
4

"I'm glad for works in a foundry"
Paul M. Wiener Foundry Co.
3

Castings:
2 POUNDS TO 250 POUNDS
Grey iron and semi-steel castings . . . of the highest quality . . . cast by P. M. W. in economical production runs.
AUTOMOTIVE CASTINGS SUCH AS:
Motor blocks, cylinder heads, flywheel housings, flywheels, water pumps, oil pumps and manifold castings, in fact, all types of relatively small automotive castings. Also a large variety of machine and appliance castings.
ALL YOUR CASTINGS—FOR A GIVEN PRODUCT FROM THIS ONE SOURCE
For greatest efficiency and economy specify P. M. W. castings for each cast part used in your product.
Write today . . . we will advise you immediately if we are in a position to handle your casting requirements.
Paul M. Wiener Foundry Co.
MUSKEGON, MICHIGAN
5

"Foundries pay good wages"
Paul M. Wiener Foundry Co.
a good place to work
10th St. and Western Ave.
6

YOU KNOW, BILL— A MODERN FOUNDRY IS A GOOD PLACE TO WORK...
Paul M. Wiener Foundry Co.
7

(*Concluded from page* 202)

Co-ordinated messages appeared on billboards in the Muskegon area and in the two Muskegon newspapers. The first advertisement was based upon "A new name, a new plant. Paul M. Wiener Foundry Co. A good place to work." Succeeding newspaper advertisements and billboards, some of which are shown in miniature in the accompanying illustrations, declared: "My dad works in a foundry," 'Foundries pay good wages," "There's security in foundry work, son," "I'm glad Joe works in a foundry" and "You know, Bill, a modern foundry is a good place to work." The campaign was keyed to raise the stature of foundry work generally in Muskegon, and specifically at the Wiener foundry.

Radio spot announcements were used during the first part of the campaign and a weekly 15-minute local sportscast carried the theme throughout the year. Publicity releases were specially prepared for the local newspapers, furnishing details and pictures of the new construction.

A simultaneous advertising program was conducted in Chicago, Detroit and Milwaukee newspapers. These advertisements, concentrated in a 200-mile radius of Muskegon because it was desired to develop new business only within a relatively nearby area, were designed to acquaint buyers with the new company name and to promote the foundry as the source for all castings needed in the manufacture of one product. A monthly direct mail campaign complemented the newspaper advertising.

Result of the whole program of construction, mechanization, advertising and public relations was the rebirth of an established business without change of community, operation or even actual location.

Built Around Old Plant

The contruction work naturally was the complicated part of the program, made so by the fact that heavy commitments for delivery of castings precluded a suspension of operations. Limited storage space on the premises made it necessary for structural steel to be delivered as required for construction and erected immediately upon unloading. A fireproof steel deck roof was installed 20 ft above the old roof level, and the completed structure encompassed the original plant, covering an area 170 x 417 ft.

During construction, improvements and changes were gradually made in operating departments to incorporate modern equipment. First, the maintenance department was moved into a new, 40 x 100 ft quonset building. The vacated space was used to enlarge the coreroom and install racks for core storage, a sand mixer and three additional core ovens. New lift trucks were obtained for handling core racks in and out of the ovens.

The method of handling molding sand was rearranged to accommodate new rollover machines on the molding floors. A central distributing system was installed to furnish sand to individual overhead hoppers at each machine, with similar facilities provided squeezer machine operators.

An old 60-in. cupola was dismantled to make room for a new 72-in. unit which gives the plant two cupolas of the latter size. Cleaning room capacity was expanded with addition of a new self-loading airless blast unit, while a special loading ramp was built to facilitate loading finished castings into railroad cars. Finally, new air-conditioned offices were provided.

Erie Engine & Mfg. Co., 953 East 12th St., Erie, Pa., suffered loss estimated at $125,000 in a fire starting in the core room Jan. 9.

NEW DIRECT V-BELT DRIVE MAKES SPEED-CHANGING FAST With WADSWORTH

WECO

NO. 3 CORE MACHINE

Cut costs—get increased core production—save man hours—floor space. Design improvements incorporated in the New Wadsworth No. 3 Core Maker makes speed-changing faster, requires less time per core. Simplicity of construction cuts maintenance. Protected lubrication, automatic overload control, dust-proof mechanism throughout insures safe, long-time operation. The Wadsworth No. 3 is custom-built to specifications best suited to your job requirements. Write us for complete information and data.

WE MAKE IMMEDIATE DELIVERIES OF

Stock Core Machines * Cutting Off and Coning Machines * Steel Core Plates * Steel and Aluminum Bottom Plates * Core Files * Square Twisted Steel Gaggers * Aluminum Slip Flasks * Aluminum Flexible Jackets * Metal Patterns * Aluminum Match Plates * Permanent Molds * Sand Cores from Your Core Boxes * Cores Shipped Anywhere—Send Us Your Core Boxes

SOLD THROUGH LEADING FOUNDRY SUPPLY HOUSES

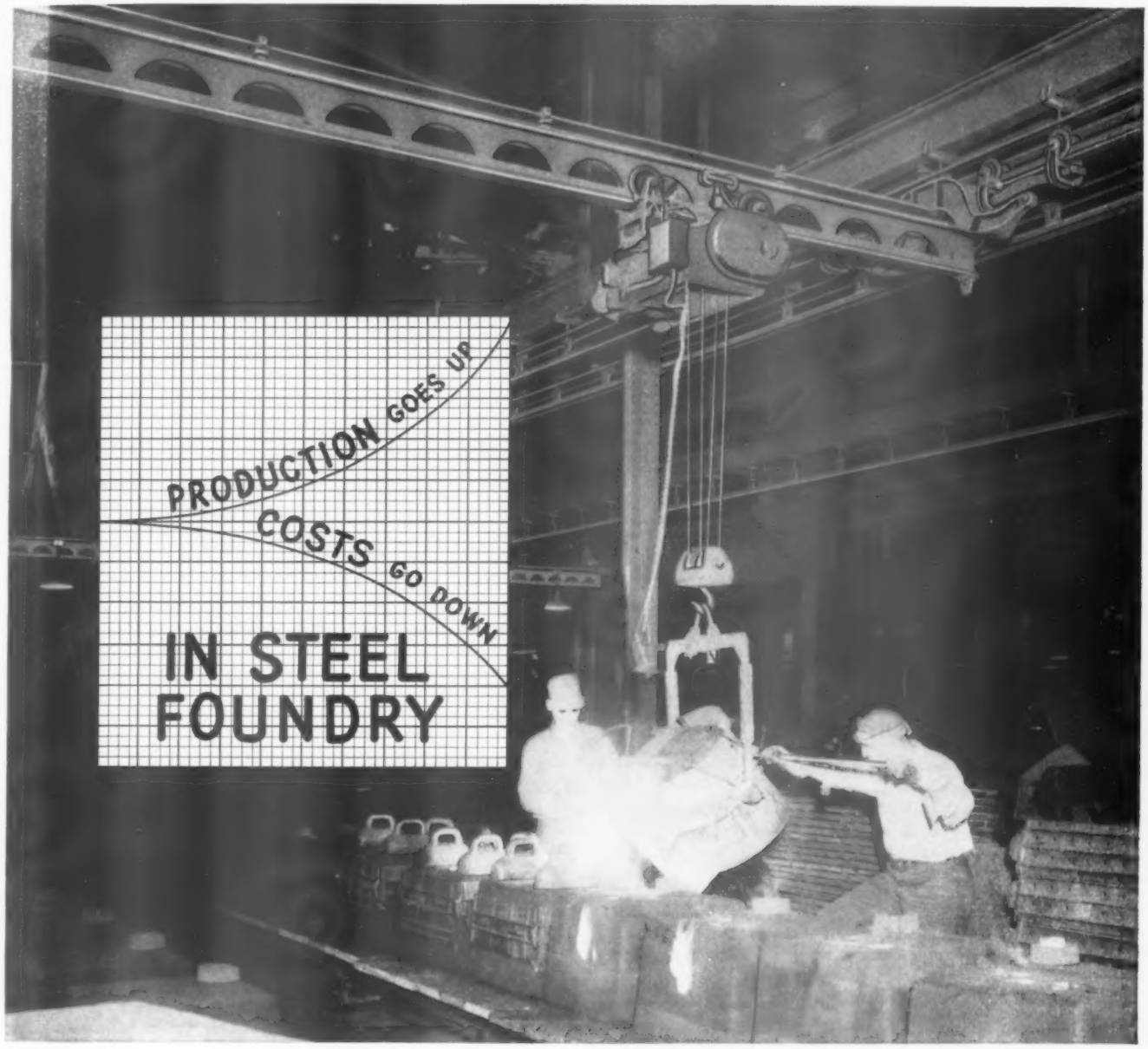
WADSWORTH EQUIPMENT CO.

2547 MOGADORE ROAD, AKRON, OHIO
P. O. BOX 1351 TEL. JE 5194

General Offices: 10 S. College St., Akron 8, Ohio

QUALITY SINCE 1911

WA-1247-64



When a large Steel Foundry installed an overhead Cleveland Tramrail system to serve its pouring floor two significant things happened: (a) production increased greatly, (b) costs went down.

Factors contributing to these results were:

1. Enabled use of larger pouring ladles
2. Provided efficient working routine
3. Reduced delivery time of metal to molds
4. Decreased heat loss in metal
5. Eliminated much hand lifting, lugging and hard labor
6. Minimized worker fatigue
7. Promoted safety

Because of the phenomenal success with the pouring floor installation, Cleveland Tramrail was installed in other departments with equally remarkable results. In nearly every instance the equipment paid for itself within the first six months of operation.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
3804 East 286th St. Wickliffe, Ohio

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

THE GRAY IRON CASTINGS INDUSTRY

(*Continued from page* 95)

captive foundries for use of the owning companies.

Distribution of Output—Table IV shows the number of foundries which market various percentages of their castings output in the open market. It is interesting to note that only 275 of the 535 reporting jobbing foundries sell all of their output as commercial jobbing castings. Almost half of the jobbing foundries produce some part of their tonnage for use in their own finished products.

Foundries marketing less than 5 per cent of their castings output in the open market are, for the purposes of this report, considered captive or manufacturing foundries. In the table there is no bracket for those selling 4 per cent of their output as no foundries reported this percentage. Of the 88 reporting captive foundries, 84 per cent do not sell castings in the open market.

Obviously the percentages of output sold as commercial, jobbing castings will vary according to the state of the market. What percentage of the 74 completely captive foundries would solicit open market business whenever all of their foundry facilities were not needed to produce their own castings requirements is conjectural and is dependent upon the management policies of the respective companies.

Other Divisions—In addition to the division of the industry as between captive and jobbing foundries there are other divisions which are generally recognized, such as the main product divisions including (1) cast iron soil pipe and fittings foundries, (2) cast iron pressure pipe and fittings producers, (3) manufacturers of molds for heavy steel ingots, (4) chilled iron railroad car wheel producers, and (5) cast iron rolling mill roll manufacturers. Several of these product divisions have trade associations of their own and logically fall outside the scope of this study. Indeed rolling mill rolls, which are a chilled cast iron product, are seldom classified as a part of the products of this industry.

The industry could be divided on the basis of production, semi-production and jobbing foundries. It could be divided according to types of castings produced, e.g. foundries specializing in textile, machine tool, electrical machinery, farm implement, tractor castings, etc. Still further divisions might include process and control groups such as Meehanite and Sorbomat licensee foundries.

All subdivisions of the industry have real significance and much could be written about each one, but from the standpoint of this report the industry will be viewed as a whole in terms of common problems for which common solutions will be outlined.

Size of Gray Iron Foundries—There are no very large production units or groups of units in the industry which are capable of dominating the business. In 1941 about half of the gray iron foundries had annual sales of $100,000 per year or less, and these foundries accounted for not more than 8 per cent of the total sales of the industry—indicative of the small size of a large percentage of the units.

In the same year about 5 per cent of the foundries had annual sales of over $1,000,000, their aggregate sales amounting to about a third of the total for the industry. In between these extremes, about 45 per cent of the foundries had about 57 per cent of the total annual sales. That is considered a fair pattern for size of gray iron foundries, classified according to sales, as it exists today.

Production Capacity—The production capacity of a foundry is one of the most difficult statistical figures to determine because of the number of operating variables, each of which can have a profound effect on potential output. Obviously the number of shifts worked is highly significant. A single shift operation may comprise eight or more hours of work. The output could be doubled

(*Continued on page* 208)

TABLE IX—Minimum Sizes of Gray Iron Castings Produced by 615 Foundries

Minimum Size of Castings Produced	Jobbing Foundries	Captive Foundries	Total
1 lb and under	477	89	566
Over 1 to 2 lb.	12	6	18
Over 2 to 5 lb.	16	0	16
Over 5 to 10 lb.	5	2	7
Over 10 to 25 lb.	2	1	3
Over 25 to 50 lb.	1	2	3
Over 50 to 100 lb.	1	0	1
Over 100 lb	1	0	1
TOTALS	515	100	615

TABLE X—Maximum Sizes of Gray Iron Castings Produced by 610 Foundries

Maximum Size of Castings Produced	Jobbing Foundries	Captive Foundries	Total
50 lb or less	34	17	51
Over 50 to 100 lb.	17	7	24
Over 100 to 250 lb.	33	6	39
Over 250 to 500 lb.	48	16	64
Over 500 to 1,000 lb.	41	14	55
Over 1,000 to 2,000 lb.	71	8	79
Over 2,000 to 4,000 lb.	67	2	69
Over 4,000 to 10,000 lb.	104	10	114
Over 10,000 to 20,000 lb.	45	7	52
Over 20,000 to 50,000 lb.	36	10	46
Over 50,000 to 100,000 lb.	13	0	13
Over 100,000 to 200,000 lb.	1	1	2
Over 200,000 lbs.	2	0	2
TOTALS	512	98	610

TABLE XI—Percentage Distribution of Gray Iron Castings Production by Consuming Industry—1941

Consuming Industry	Total U.S.	New England	Middle Atlantic	South	Midwest	Great Plains	Pacific Coast
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Machine tool	30.2	54.8	20.0	23.4	34.1	7.3	18.0
Diesel & auto engines	13.7	.5	....	.9	22.8	....	5.6
Aircraft & ordnance	6.4	5.0	7.5	8.8	3.3	6.2	16.7
General machinery	6.1	4.7	4.4	....	8.0	4.7	....
Steel	6.0	....	21.0	3.6	1.5	....	....
Building & construction	4.5	4.2	3.9	9.0	2.9	2.6	16.8
Shipbuilding	4.2	8.5	4.6	7.5	1.9	1.2	25.0
Utilities	3.9	2.2	3.4	3.8	4.6	2.6	....
Railroad	3.8	.5	7.5	3.4	2.3	13.4	....
Electrical	3.7	1.5	7.5	....	1.8	18.2	....
Chemical & Ceramics	2.1	1.0	4.1	9.8	....	2.3	1.0
All others	15.4	17.3	16.1	29.8	16.9	41.5	17.0

Source: Survey of the Gray Iron Castings Industry, Office of Price Administration, Iron and Steel Price Branch.

TABLE XII—Principal Markets for Gray Iron Castings

Market	Number of Foundries Which Reported Serving Market: Jobbing Foundries	Captive Foundries	Total
General machinery builders	304	6	310
Machine tool builders	211	4	215
Agricultural machinery manufacturers	167	12	179
Building & construction	144	12	156
Electrical machinery manufacturers	118	4	122
Utilities	114	4	118
Automobile manufacturers	107	4	111
Municipalities	95	6	101
Furnace & stove manufacturers	92	3	95
Diesel engine manufacturers	76	2	78
Household appliance manufacturers	69	7	76
Chemical works	51	7	58
Rolling Mills & steel plants	54	2	56
Railroads	52	2	54
Shipbuilders	30	1	31
Aircraft manufacturers	10	2	12

Tubes are easily and quickly inserted or removed, without tools. Only very fine, float dust ever reaches these tubes—never the coarse, abrasive particles.

Dustubes are easily reached from a central walkway. Here, on the clean air side of the filter, one man makes a quick, clean inspection or replacement.

Tubes are light, compact, easy to store and ship. They are never under tension—never in contact with metal which may abrade or corrode the fabric.

Even very fine silica dusts are trapped with nearly 100% efficiency by weight. Discharged air shows less than 10 million particles per cubic foot from 2 to 10 microns in size.

Users are proving it everywhere . . .

"Only Dustube Dust Collectors have all these advantages"

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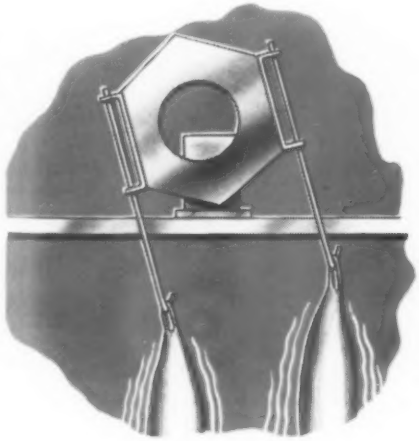
One-man inspection and maintenance, lower power requirements, keep costs down. Tube replacement in mere seconds, and fast shaker cleaning, mean down time is held to the minimum. Tests prove Dustube is nearly 100% efficient in trapping even the finest silica dusts.



Dust is completely removed from the filter tubes, which are shaken like a rug while deflated and limp. Result: lower resistance, longer cloth life, direct saving in horsepower.

Write for your copy of Catalog 72. It contains complete information about Dustube as well as valuable ventilating data.

American
WHEELABRATOR & EQUIPMENT CORP.
(FORMERLY AMERICAN FOUNDRY EQUIPMENT CO.)
505 S. Byrkit St. Mishawaka 2, Indiana

dustube
DUST COLLECTORS

(*Continued from page* 206)

or trebled if two or three shifts were worked, instead of a standard one of eight hours only. The cupola output may be a limiting factor—again it may not. The molding or coreroom capacity or the cleaning room facilities may represent bottlenecks. The nature of the work in the shop may change from simple to complex designs, which would slow production and reduce potential output. There are clean-up gangs which work on a second or night shift which have an effect on nominally single shift output. There are other factors which make it difficult if not impossible to determine with accuracy the maximum potential output of a foundry or group of foundries.

No satisfactory formula for computing maximum potential output, applicable to all foundries, has yet been devised. This has led to the establishment of what is known as "rated capacity" or "maximum commercial demand" as the best measure of foundry operations. This figure is generally computed by averaging the best six consecutive months production (or shipments) in recent (non-war) years and letting that figure represent 100 per cent operations. Such a realistic capacity figure takes into consideration the location of the foundry with respect to markets, the competitive limitations under which it normally functions, the economical operating schedule based on labor supply and costs, and all other elements affecting the commercial demand on the individual foundry.

Using such a yardstick foundries have a means of discussing current operations in terms of a common standard of comparison. Sixty per cent operations, regardless of whether the reporting foundry is working one, two or three shifts, and regardless of other variables, means the same thing as in the case of any other foundry reporting the same percentage of operations. Such a formula, used by the rolling mills and steel foundries, furnishes the only basis on which comparable reports on operations can be made which have real meaning to other producers.

Weekly Capacity — Five hundred sixteen (516) jobbing foundries reported a combined weekly production capacity of 46,542 net tons of good castings based on a 40-hour work week. Ninety-five (95) captive foundries reported a combined weekly production capacity of 12,594 net tons of good castings based on a 40-hour week. See Table V.

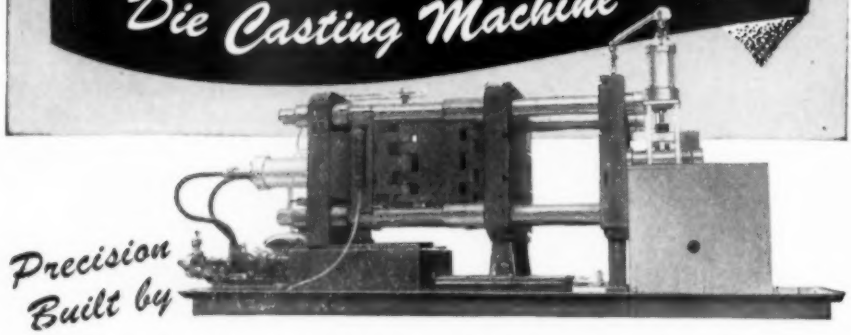
Multiplying these figures by 50 to obtain annual production capacity on a 40-hour week basis produces 2,327,100 net tons of capacity for the jobbing foundries and 629,700 tons of capacity for the captive foundries, representing a combined annual capacity of nearly 3 million tons for an 8-hour single-shift, five-day week.

Multiplying the figures for jobbing foundries by two and those for captive foundries by four, we obtain a total combined annual production capacity of a little over 7 million tons on a 40-hour week basis. On a three-shift basis, the combined maximum output would be more than 20 million net tons (a wartime potential capacity). From a realistic standpoint, maximum production capacity is probably limited by the availability of coke, pig iron and scrap. It is doubtful whether more than 15 million tons of gray iron castings could be produced annually, even assuming that all facilities for producing pig iron and coke were operating at full capacity.

The jobbing foundries showed average weekly production capacity of 90.2 net tons of good castings per plant. The comparable figure for captive foundries was 132.6 net tons.

(*Continued on page* 210)

Step Up Production • Cut Operating Costs
with the NEW, IMPROVED
"CAST-MASTER"
Die Casting Machine



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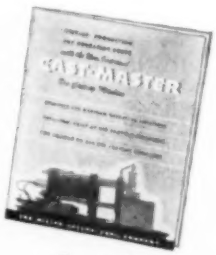
DIE-CASTING ENGINEERS...
for Zinc, Tin, Lead, Magnesium or Brass

● A die-casting machine that has withstood the rigid test of American industry. Designed and built by die-casting engineers and under constant observation of experts for years. As a result the present models embody the very newest in engineering development and offer unparalleled performance at a new low in operating cost.

New feature eliminates necessity of opening of die to a maximum to eject casting

Now with the new Cast-Master there's no need to open the die to 12 to 14 inches when 5 inches is sufficient to eject the casting. With the loosening of two jam nuts the stroke can be adjusted to the space necessary to make the ejection. A feature that steps up production immeasurably and saves time and labor.



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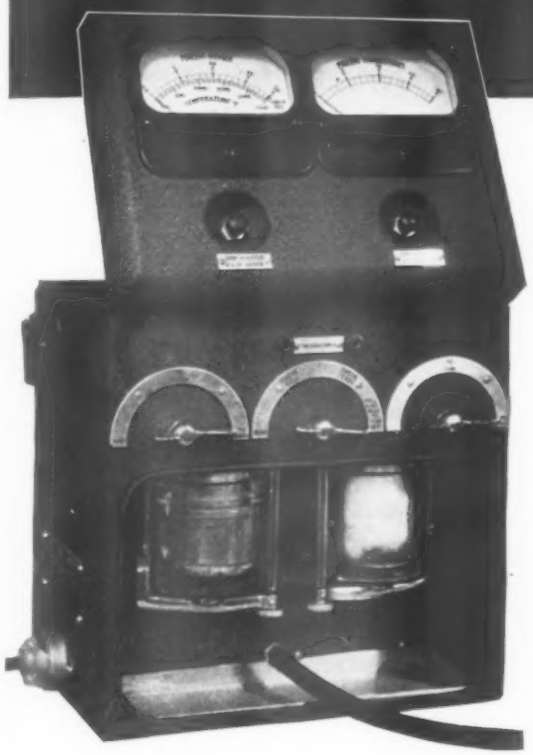

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SHREVEPORT

(*Continued from page* 208)

indicating that captive foundries, on the average, are about half again as large as the average jobbing foundry.

The statistics on weekly production capacity presented above covered data based on a standard 40-hour week. The figures in Table VI represent weekly production capacities based on normal operating and production schedules actually existing at the different foundries during the second quarter, 1947, as reported by 602 foundries.

Comparing these figures with those based on a 40-hour week, it would appear that the reporting foundries operated during the second quarter of 1947 using capacity figures about 37 per cent greater than those which would have represented output for a forty hour week.

Industry Statistics—Up to 1939 statistics on gray iron castings were combined with those for malleable iron castings by the Department of Commerce, Bureau of the Census. Separate figures for gray iron as published for the years 1937 and 1939 are not complete. In fact, prior to 1943 there are practically no reliable statistics applicable to the gray iron casting industry. It was not until in that year, the War Production Board teamed up with the Bureau of the Census to obtain trustworthy data covering the industry that truly representative figures became available. The Bureau of the Census series, now known as the "Facts for Industry" series (M21A) on Gray Iron Castings, provides thoroughly reliable information on unfilled orders and shipments. The series also differentiates between shipments made by commercial foundries and captive plants, as well as by major product divisions.

Data Are Gathered

A visit to the Census Bureau's office to observe the procedure by which these data are gathered, classified, tabulated and published will convince anyone that the resulting data could hardly be improved upon. There are several supervisors directing the operations of four men and a number of girls who devote a considerable amount of their time each month to the preparation of this series. Monthly reports are based upon a large and representative sample of the entire industry. The bureau's annual summaries are practically 100 per cent complete, representing returns from almost all gray iron foundries in the country. Comparison of the figures obtained monthly and those resulting from these comprehensive annual surveys furnishes a check on the completeness of the figures received monthly. This difference is stated to be in the order of about 10 per cent. Until the next yearly survey has been completed, all monthly figures are increased by this factor (say 10 per cent). Each year the correction factor is changed, based upon the latest annual survey figures.

In view of the thorough and meticulous methods used by the Census Bureau in preparing the gray iron statistical series, it is recommended that these figures be considered official by the industry and that no thought be given to the society gathering similar data.

Shipments and Production — Inasmuch as commercial jobbing foundries rarely produce castings for inventory, monthly shipments and production figures are always in very close agreement. Production usually exceeds shipments by a few per cent which can be accounted for, at least in part, by the fact that foundries make a few repair and replacement castings for their own plant and for

(*Continued on page* 212)

Grinding operations are easy when you use a Stearns Grinder Holding Magnet. Grips your material securely, safely, efficiently—a very flexible job that will cut your costs. Saves time of chucking up, make-shift jigs and clamping devices. Ask for information on the Stearns Grinder Holding Magnet.

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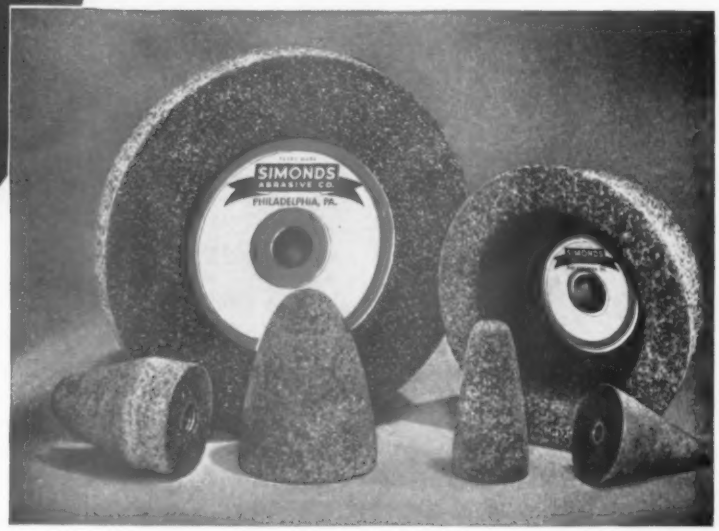

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(*Continued from page* 210)

other than strictly commercial customers. Since there is such close agreement between shipments and production, the Bureau of the Census data, which cover shipments only, can serve as a measure of both shipments and production.

Unfilled Orders — Unfilled orders are a measure of the industry's backlog of business. This backlog rarely exceeds 30 to 60 days. Patterns often go into the sand within a few days following their receipt at the foundry. When demand is abnormally heavy, as it has been for the past several years, orders pile up and must await their turn to be scheduled for production. Unfilled orders are usually considered an accurate index of demand and hence a measure of the prosperity of the industry. No captive, "own-use" tonnage is included in the unfilled orders figures.

Table VII sets forth the production of high test and commercial grades of gray iron castings for the year 1946 as reported by foundries participating in the survey. This table shows that about 19 per cent of the 1946 jobbing production reported consisted of special high test iron castings and that a little over 15 per cent of the 1946 output of captive foundries was in that category.

There is duplication in the number of foundries shown in this table due to the fact that some foundries produce both commercial and high test irons. Table VIII eliminates this duplication.

While 626 foundries submitted usable questionnaire data in connection with the industry survey on which much of the information contained in this report is based, only 569 foundries reported production data. As a test of the completeness of industry coverage represented by the foundries which reported, it is necessary that several hypotheses be applied to the survey figures. Assuming that the foundries which participated in the survey but which did not give production figures had 1946 production equal to the average of those which did report output, the 626 foundries covered by the survey represented a combined 1946 production of approximately 2,500,000 net tons, of which about 750,000 tons represented captive tonnage and 1,750,000 tons represented jobbing foundry output.

Bureau of Census Reports

It is next necessary to assume that the foundries which participated in the survey did not include producers of pressure and soil pipe, chilled iron railroad car wheels and ingot molds. This would seem to be a reasonable hypothesis since these products are generally regarded as falling under the jurisdiction of other trade associations.

The Bureau of Census reported gray iron castings shipments for sale (jobbing tonnage) for 1946 amounting to 3,665,061 net tons and for own use (captive foundry tonnage) for the same year amounting to 3,287,401 tons. Assuming these shipments to be comparable with the production tonnages developed by the survey, it would appear that this report rests on returns from jobbing foundries which enjoyed about 48 per cent of the 1946 jobbing production and on returns from captive foundries which accounted for about 23 per cent of the 1946 captive foundry output.

Accordingly, to determine *quantitative* approximations covering the entire miscellaneous gray iron castings industry, it would be necessary to *double* figures for jobbing foundries shown in this report and to multiply captive foundry figures by *four*.

(*Concluded on page* 214)

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• The most widely used of all fire clays in midwest foundries. They supply every bond and refractory requirement. These clays are prepared in a large, modern grinding plant, which for 32 years has served the foundry industry with prompt and dependable shipments.

Valuable consultation is available with experienced engineers for the best use of fire clays in foundry bond and refractory service. They often supply important help for the reduction of foundry scrap losses.

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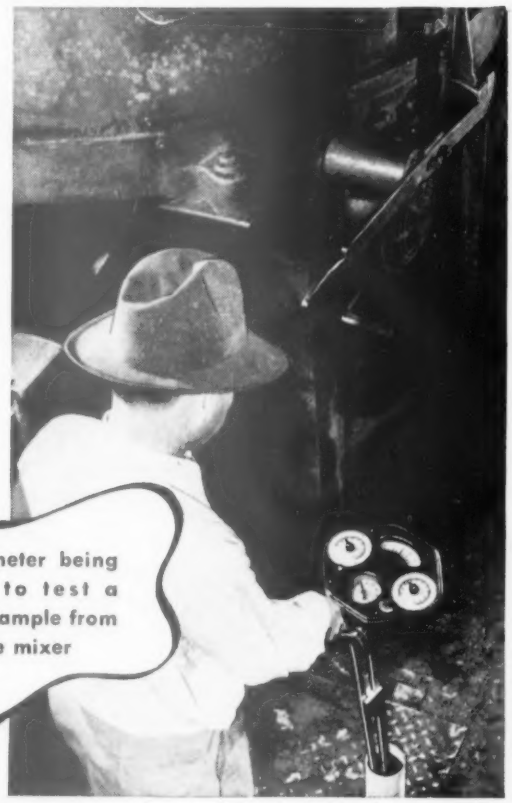
Fast • Portable • Accurate—Electric Moisture Tester FOR THE FOUNDRY

The Moistmeter is a versatile instrument that determines instantly the exact moisture percentage of either core or molding sand, on the floor or in the sand system.

It is ruggedly constructed, simple to operate and easy to carry around. Moisture readings can be taken at selected depths, from either a pint can or a large bin in just three seconds.

When you equip each sand preparation crew with the Moistmeter, you can control the moisture range within exactly specified limits with considerable improvement in your castings.

Moistmeter testing moisture of sand on the foundry floor.



Moistmeter being used to test a sand sample from the mixer

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(*Concluded from page 212*)

It is believed that the per cent of coverage represented by this report (1) provides an excellent quantitative sample of the entire industry; (2) that the sample is a true cross section, including large, medium and small units, and (3) the derived data can safely be used for the purpose of tracing trends and developing valid plans.

Size of Castings Produced—Tables IX and X show the smallest and largest size castings produced by reporting foundries. From these tables it is concluded that practically all gray iron foundries will accept orders for light-weight castings (under 10 pounds each) but that few foundries are able to handle orders for castings weighing over 25 tons each. Indeed, the upper weight range for most gray iron foundries is 5 tons. Only one foundry in four will accept heavier work.

Generally crane and cupola capacities are the limiting factors on the size of castings which can be handled safely.

Distribution of Sales—Little information regarding the quantitative sales of gray iron castings to consuming industries is available. Such a breakdown of sales (Table XI) was prepared by the Office of Price Administration for the year 1941 and is the best market study presently available.

The sales distribution pattern shown in Table XI is undoubtedly distorted by wartime production, for it will be recalled that the machine tool industry was the first to feel the mushrooming of wartime demand and the 30.2 per cent of the total sales of gray iron castings, as shown for that industry, could not possibly represent a normal situation. A more detailed market study for some future postwar year, believed to be reasonably normal, would be highly desirable. However, it should be emphasized that such a study is an extremely difficult and expensive undertaking and should probably be deferred for some years—at least until after the abnormalities of the immediate postwar demand for gray iron castings have disappeared and a normal market pattern has been established.

Principal Markets — Table XII shows the 16 principal markets for gray iron castings arranged according to the number of times they were mentioned as being served by reporting foundries.

The analysis shown in Table XII does not indicate the volume of production absorbed by the several markets nor the value of such production, hence the order of listing is not necessarily indicative of the relative, over-all importance of these markets to the industry.

Other markets mentioned by a few foundries (6 or less) were: automotive repair machinery, boiler manufacturers, coal and coke plants, coal mines, food products machinery, foundry equipment manufacturers, glass manufacturers, incinerators, industrial repairs and replacements, metal smelters, oil field equipment, oil and gas pipe lines, optical manufacturers, package machinery, paper mills, petroleum production, piano manufacturers, processing industries, refractories manufacturers, saw mills, textile machinery, tool and die plants, toys, water pumps and wire mills.

The facts regarding principal markets are of prime value in connection with any advertising and sales promotional programs initiated by the society. Table XII also furnishes clews as to the consumer industries most likely to establish captive foundries based upon the number of companies in the respective fields which have already done so.

(*To be concluded next month*)

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AJAX *Electric Co., Inc.*
AJAX *Engineering Corp.*

OBITUARY

LOUIS E. KEEN SR., 66, president, Keen Foundry Co., Griffith, Ind., died Jan. 17. A native of Toledo, O., Mr. Keen was superintendent of the U. S. Malleable & Maumee Malleable Foundries until 1914, when he became general superintendent of the Wanner Malleable Castings Co., Hammond, Ind. In 1927 he resigned and opened his own gray iron foundry at Griffith, where he had been active until his death.

* * *

William L. Beaudway, 63, president, Chicago Malleable Castings Co., Chicago, and executive vice president of its affiliate, Allied Steel Castings Co., Chicago and Harvey, Ill.,

WILLIAM L. BEAUDWAY

died Jan. 28 in Chicago. Mr. Beaudway began his business career with the old Studebaker Wagon Works, South Bend, Ind. He had served as president of Chicago Malleable for the last two years.

* * *

George U. Shuman, 68, associated with the Oliver Corp., South Bend, Ind., since 1907, died at his home there Jan. 18. Mr. Shuman, a native of Greencastle, Pa., served the Oliver organization as a process engineer, foundry superintendent, patternshop superintendent and during the modernization of its foundry division was in charge of the program. For many years he had been a member of the Michiana Chapter of the American Foundrymen's Association.

* * *

Harold H. Berresford, 67, managing director, Staveley Coal & Iron Co. Ltd., Chesterfield, England, died suddenly Jan. 18. Mr. Berresford entered the company as an accountant in 1898 and later became assistant general manager, commercial manager, deputy managing director and managing director. He was also a director of Bradley & Foster Ltd., Darlaston, England, Doncaster Amalgamated Collieries Ltd., and National Benzole Co. Ltd. He was a founder of the Joint Iron Council, an association of the Council of Ironfoundry Associations and the Council of Iron Producers, and had been president since its origin.

* * *

Howard W. Gilbert, 67, engineering assistant to the president, National Malleable & Steel Castings Co., Cleveland, died suddenly Jan. 16, in that city. Mr. Gilbert attended Purdue University for 2 years and went to Cleveland in 1907, where he served as a draftsman for Osborn Mfg. Co. until he joined National Malleable in 1908. He was appointed chief inspector in 1916 and manager of the inspection and test department in 1918.

* * *

Dudley Shoemaker, 61, founder and a director of the Atlantic Steel Castings Co., Chester, Pa., died Jan. 2, in Union Memorial Hospital, Baltimore. Mr. Shoemaker was born in Philadelphia and was graduated from University of Pennsylvania. He was

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associated with American Steel Casting Co., Indiana Harbor, Ind., and several steel plants in Maryland and Pennsylvania for more than 30 years prior to founding Atlantic Steel Castings Co. He had also been a vice president of the Poole Foundry & Machine Co., Baltimore.

* * *

Albert H. Chatley, 55, a vice president and general manager, Delta Mfg. Division of Rockwell Mfg. Co., Milwaukee, died Jan. 24, at his home in Fox Point, Wis. A native of Bradford, Pa., Mr. Chatley had been associated with Delta Mfg. Division for 9 years. Prior to that he had been secretary-treasurer of the Wisconsin Axle Co., Oshkosh, Wis.

* * *

Herman S. Thurston, 80, founder and vice president, Poughkeepsie Foundry & Machine Co., Poughkeepsie, N. Y., died Jan. 18, at his residence there. Mr. Thurston was formerly vice president of the Standard Gage Co., Poughkeepsie.

* * *

Samuel R. Capps, vice president of the C. I. Capps Co. Inc., Jacksonville, Fla., died Jan. 15, at his home there, following a long illness. Mr. Capps was born in Charlotte, N. C., and went to Jacksonville in 1904. He had been associated with his father's foundry since 1919.

* * *

Henry A. Kelley, 63, sales manager, City Pattern Foundry & Machine Co., Detroit, died Dec. 16. Mr. Kelley, a native of Pawtucket, R. I., was a graduate of the Brown & Sharpe engineering school and was associated

HENRY A. KELLEY

with General Motors Corp., Detroit, for 5 years prior to joining City Pattern Foundry & Machine Co., as sales manager 23 years ago.

* * *

Walter W. Hughes, for 30 years service engineer, Herman Pneumatic Machine Co., Pittsburgh, died recently, at his home in Lake Geneva, Wis. Mr. Hughes was born in England and was 11 years of age when he came to this country. He was retired as service engineer at Herman Pneumatic Machine Co. in 1945.

* * *

Raymond G. Aurien, 52, assistant chief mechanical engineer, American Steel Foundries, Chicago, died Feb. 5, in Evanston, Ill. Mr. Aurien had been a member of the engineering staff of American Steel Foundries since 1929.

* * *

Ernest Tyler, 61, foundry superintendent, steel division, Canadian Car & Foundry Co., Longue Point, Que., died recently. Mr. Tyler joined the company in 1910 as an apprentice.

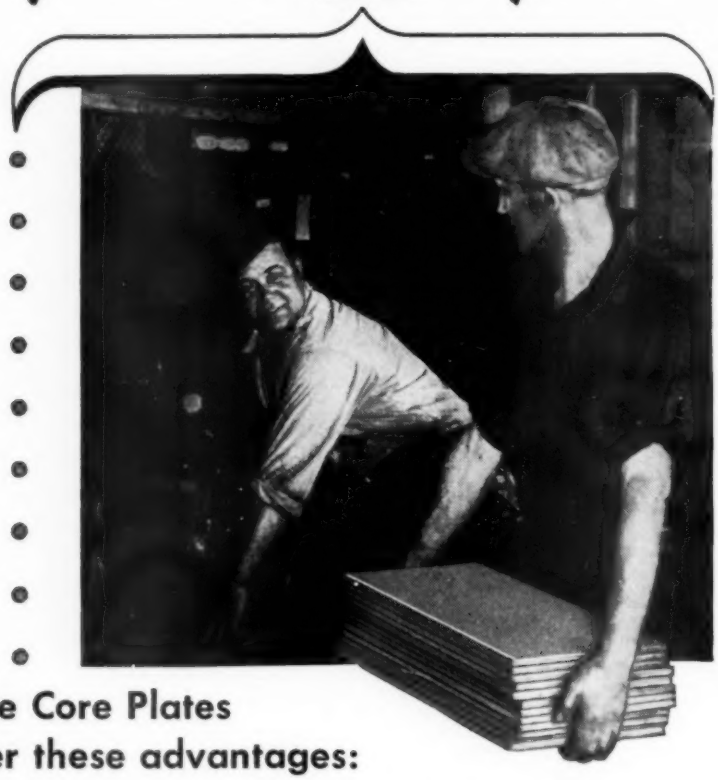
* * *

Conrad W. Bischof, 53, treasurer, Copper Clad Malleable Range Co., St. Louis, died Jan. 14, of a heart attack.

* * *

Louis G. Vock, 55, Chicago district sales manager, Metal & Thermit Corp., died Jan. 26 in Chicago.

"Sa-ay...these are Lighter"



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Transite Core Plate surfaces stay smooth even after long service. Warpage is less than 0.1%.

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Low price, low maintenance and long life add up to low cost.

To eliminate green cores and reduce baking time, perforated plates are also available.

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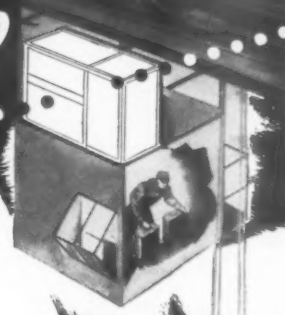

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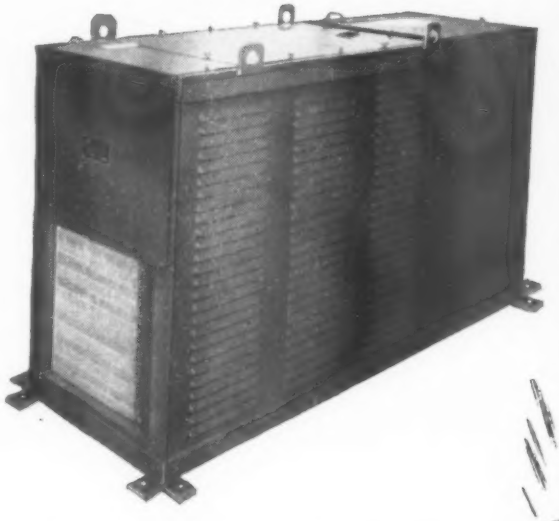
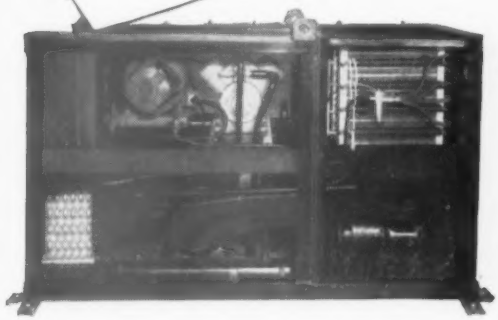
DRAVO CRANE CAB COOLERS are designed for mill duty under the most severe conditions.

Dravo Engineers have given long study to the maintenance problem and to the arrangement of equipment so that it is quickly accessible.





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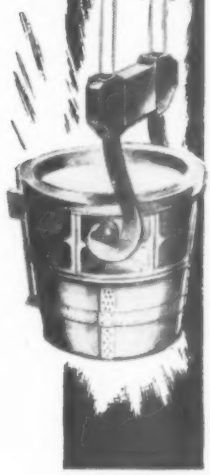

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Overhead Handling

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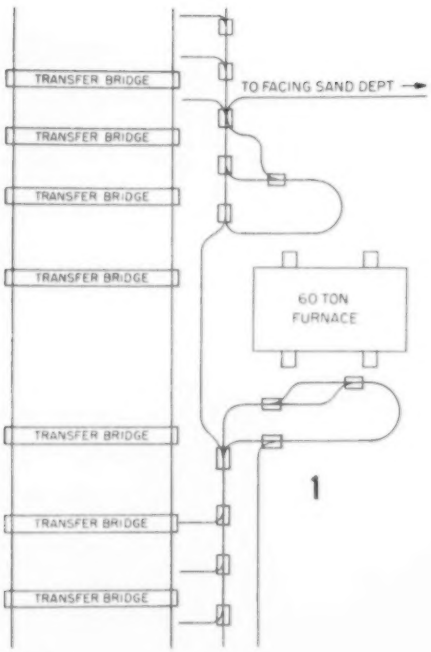
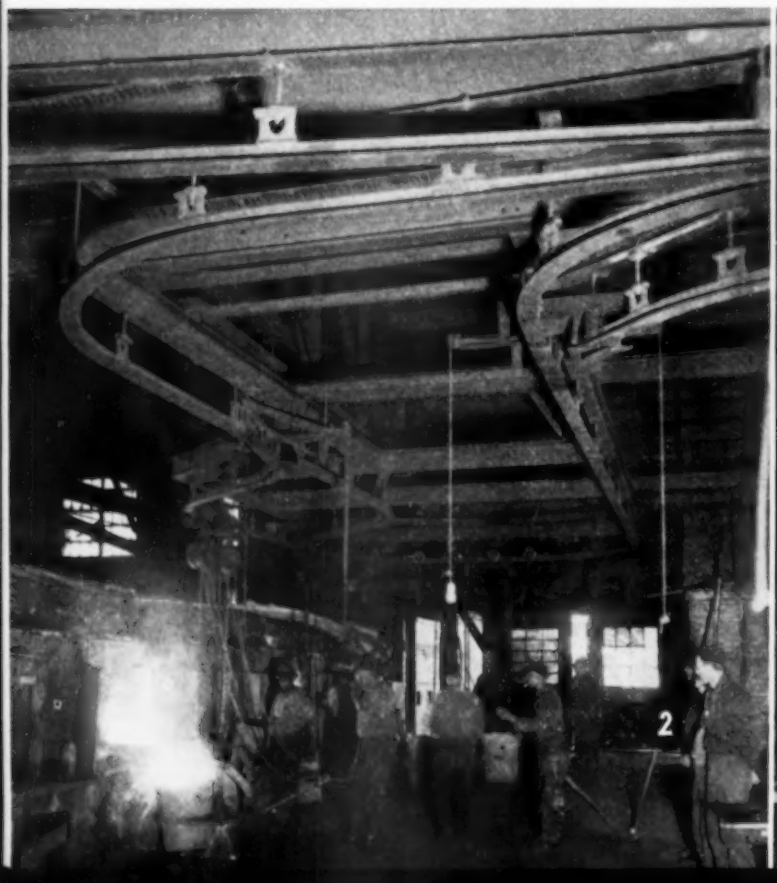


TERRE Haute Malleable & Mfg. Corp., Terre Haute, Ind., now has in service a comprehensive handling system which provides complete coverage of the foundry pouring floor. This system employs overhead tramrails on which the ladles may travel smoothly and safely. The equipment leaves the floor space free, avoids the accident hazards incident to manual handling of ladles filled with molten metal, and involves little maintenance expense. The overhead system also is used to move sand to and from the mullers and to transport castings and molds. In all of this work considerable time and labor are saved compared with manual methods.

Fig. 1 shows the layout of the overhead system in one of the foundry buildings. It will be noted that the 60-ton capacity air furnace is centrally located, with the monorails arranged so that hot iron may be transferred to the suspended ladles with a minimum of effort. Track loops permit ladle carriers to by-pass each other, thereby eliminating waiting time and allowing uninterrupted pouring. The furnace tracks and loops are shown in Fig. 2.

An overhead track extends at one side the full length of the pouring floor. As indicated in Fig. 1 a branch track extends into the facing sand department over which sand is brought to the molders. The main floor area is also covered by the two tracks for the seven transfer bridges, with spurs provided for running the carriers onto the bridges. This layout facilitates not only pouring but also the molding and shakeout operations.

Fig. 3 illustrates how large castings weighing up to 200 lb each are poured from two ladles simultaneously using two transfer bridges. Ladles up to



System

By FRANCIS A. WESTBROOK

Fig. 1—Layout of overhead tramrail system in foundry

Fig. 2—Filling ladle at the furnace. Note overhead monorail switches and loops to keep carriers moving around ladles being filled

Fig. 3—Pouring from two ladles simultaneously

Fig. 4—Sand bucket at the molding and pouring floor

Fig. 5—The facing sand department

(Photos Courtesy Cleveland Tramrail Division, Cleveland Crane & Engineering Co.)

1000 lb capacity are employed in order to minimize traveling back and forth between the furnace and molds.

The sand bucket shown in Fig. 4 is being taken from the molding floor by overhead carrier directly to the facing sand department by means of the interlocking tramrails without any rehandling. Used sand in the bucket will be mulled and returned in the same manner to the molders. This illustration shows the monorail paralleling the overhead rails for the transfer bridges serving the molding and pouring floor. At the right of the carrier may be seen the track spur for shunting the carrier on or off the transfer bridges.

The facing sand department, shown in Fig. 5, is provided with a loop around the area where used sand is dumped prior to being remixed and loaded into buckets for return to the molding floor.

Scrap Pile or Shipping Room?

Where do most of your castings end up? Shop scrap is mighty fine to re-melt, but isn't it a pleasant feeling to look yours over and note that it's practically 100% gates and sprues? Let Semet-Solvay Foundry Coke and Semet-Solvay metallurgists help keep your rejects down and your profits up. They can do it!

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Young Men Offered Free Foundry Course

Detroit Chapter of the American Foundrymen's Association is sponsoring a foundry course for the young men of Detroit. Enrollment is free. Object of the course is to acquaint the young men of Detroit with the many interesting and remunerative jobs and positions offered by the foundry trade.

The course will consist of four sessions, each two hours long. The first class starts at 7:30 p.m., Mar. 10. The second, third and fourth sessions follow on Mar. 17, 24 and 31. Classes will be held at the University of Detroit, physics lecture room.

The course will deal with the various phases of selling foundry products, foundry management, general plant operations and metallurgy. It will be presented in a unique manner in that a new, excellent and qualified speaker will be presented to the class every half hour.

No registration, enrollment or other fees of any kind are involved, the only requirements being a genuine interest in what the foundry industry has to offer.

Further details may be obtained from Jess Toth, chairman, AFA Educational Committee, care of Harry W. Dietert Co., 9330 Roselawn Avenue, Detroit 4, Mich.

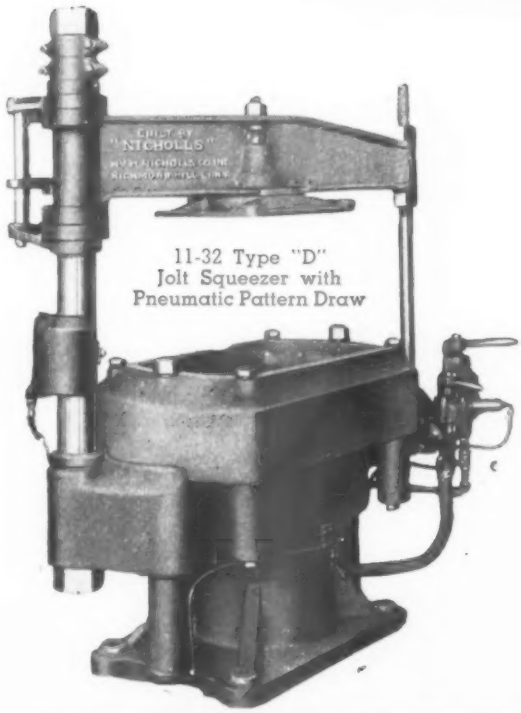
Nonferrous Cost Course Started

National Cost Committee, Non-Ferrous Founders' Society, has completed a lecture course on the cost system published by the society in 1947. The course is to be presented by a competent instructor engaged by each of the chapters. It consists of approximately six evening lectures and will be completed by May 1. Enrollment is not confined to accountants only, but may include key men who are responsible for cost control, estimating and production.

Such a course was successfully completed by the Boston Chapter. A similar course was inaugurated in February by the Cleveland Chapter at Fenn College under the direction of U. F. von Rosen, Fenn's accounting department head and partner in the public accounting firm of Soloway & von Rosen.

Ward Machine & Foundry Co., Richmond, Ind., is constructing a 50 x 145-ft building which is expected to triple foundry output.

WORKMANSHIP



Smooth, sensitive operation is built into all the moving parts of every NICHOLLS MOLDING MACHINE. This quality WORKMANSHIP is a result of our expert mechanics who take pride in producing one of the finest lines of MOLDING MACHINES in the world! These Machines produce a maximum number of good molds, enabling you to meet production schedules on time!

NICHOLLS offers a complete line of portable and stationary types for producing light, medium and heavy castings. All machines are available with electric controls for push-button operation.

Wm. H. NICHOLLS Co., Inc.

RICHMOND HILL 18, LONG ISLAND, NEW YORK

ESTABLISHED 1910

FOREIGN MANUFACTURERS AND SELLING AGENTS FOR CONTINENTAL EUROPE AND GREAT BRITAIN — GEORGE FISCHER, LTD., SCHAFFHAUSEN, SWITZERLAND

NICHOLLS

Industry BRIEFS

KOPPERS CO. INC., Koppers Bldg., Pittsburgh 19, has acquired all outstanding stock of Missouri-Illinois Furnaces Inc., an Illinois corporation formed Oct. 1 to purchase the government-owned blast furnace and coke plant at Granite City, Ill. At the same time War Assets Administration and the Department of Justice have approved sale of the Granite City plant to Missouri-Illinois for $3,255,000. Missouri-Illinois, originally formed jointly by Koppers and Hanna Coal & Ore Corp., had bid a similar amount for the plant in October. The bid was accepted by WAA, but later the Department of Justice disapproved the sale if the corporation were jointly owned.

° ° °

Truck-Man Inc., formerly a division of Yard-Man Inc., 1410 West Ganson St., Jackson, Mich., has incorporated as a separate unit to manufacture gasoline powered hydraulic lift and platform trucks. Yard-Man Inc. continues as manufacturers of lawn mowers exclusively.

° ° °

Newcomb-Detroit Co., 5741 Russell St., Detroit 11, manufacturer of finishing systems and dust arresting systems, recently acquired the Newcomb Engineering Co., Grand Rapids, Mich., which will be known as the Grand Rapids Division. Ian B. MacLellan has been appointed general manager of the company, and Richard W. Wenzell has been appointed manager of the Grand Rapids Division.

° ° °

Tennessee Products & Chemical Corp., 404 American National Bank Bldg., Nashville, Tenn., will operate the plant of Southern Ferro Alloys Co., 2108 Chestnut St., Chattanooga 2, Tenn., which it acquired in May, 1947, as its Southern Ferro Alloys Division. John Kruesi will continue as manager, and there will be no change in personnel.

° ° °

National Screw & Mfg. Co., 2440 East 75 St., Cleveland, has purchased Chester Hoist Co., Lisbon, O. George Neilson Bolton is manager and Hal F. Wright, former president and principal owner of Chester Hoist Co., will remain with the organization for a period. Lisbon plant will be known as the Chester Hoist division of National Screw & Mfg. Co.

° ° °

Elmira Foundry Co. Inc., 100 Woodlawn Ave., Elmira, N. Y., formerly a General Electric Co. affiliate, has been made an integral part of GE. Capacity of the plant has been increased from 550 to 800 tons of finished castings per week and ventilation and lighting facilities have been improved. Ralph H. Roberts continues as manager of the Elmira Works.

° ° °

Union Malleable Mfg. Co., Ashland, O., has incorporated a subsidiary company, Ashland Steel Products Co. Plant is making roller bearing skates and plans to produce farm running gear, a two-wheel steel dump trailer and steel wagon boxes.

° ° °

Mullins Non-Ferrous Castings Corp., 1800 South Eighteenth St., St. Louis, has been commissioned by the physics department of Washington University, St. Louis, to produce precision castings for special equipment for research projects.

° ° °

Eyermann Aluminum Castings, Robertson, Mo. has moved to 9921 St. Charles Rock Rd., St. Louis County, Mo. The company will do permanent molding and plastic pattern work in addition to sand casting.

° ° °

Rankin Wood & Metal Pattern Co., 1094 East 222nd St., Cleveland, is the incorporated name of the former Rankin Pattern Works. Firm makes wood and metal patterns and aluminum castings.

° ° °

Havana Metals Inc., Havana, Ill., has been incorporated to manufacture and distribute metal and gray iron products. George E. Keys is president.

° ° °

Thew Shovel Co., Elyria, O., is constructing a one-story 40 x 80-ft addition to its foundry at Hazel & Beech Sts. Cost is estimated at $14,000.

° ° °

Reliable Castings Corp., 3530 Spring Grove Ave., Cincinnati 23, has purchased the property located at that address and which it has occupied under lease since 1935.

° ° °

C. W. Lawmaster, owner and operator of the Broken Arrow Castings Co., Broken Arrow, Okla., has sold a half interest in the company to C. E. Coshaw.

° ° °

Pioneer Alloy Metal Co., 1781 Octavia Ave., Cleveland, plans a $7000 foundry addition.

° ° °

C. G. Bretting Mfg. Co., 34th Ave. E., Milwaukee, suffered $30,000 fire damage Jan. 23.

° ° °

Clarke H. Joy Co., 6523 Euclid Ave., Cleveland, has been formed by Clarke H. Joy, former district man-

(*Concluded on page 224*)

NEW LOCATION: Frederick B. Stevens Inc., Detroit, distributor of foundry and metal finishing equipment and supplies, has moved from 510 Third St., to 1800 Eighteenth St. at Vernor Highway West. The new property provides more than double the floor space of the former plant, which had ben occupied for more than 45 years. Larger, more modern offices and laboratories and increased manufacturing and warehouse area are grouped under one roof.

Smith L-O ...the Better Core-Oil

Thanks to the Dow-Therm method of heat treatment, Smith L-O Core Oil is a *better* oil. Better because it is thoroughly homogeneous... better because it is always of the same uniformity.

MOLDED TO *Perfection!*

Smith L-O Core Oil

WAREHOUSE STOCKS AVAILABLE
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- Frank C. Maley Detroit, Michigan
- Wm. Holmes Tomkins Tidewater Terminal South Kearny, New Jersey
- Malcolm G. Stevens Arlington, Mass.
- M. W. Warren Coke Co. St. Louis, Missouri
- Western Foundry Sand Co. Seattle, Washington
- Western Industrial Supply Co. Portland 14, Oregon

The advantages of using this high-quality oil are many—claims which we can prove!

- Superior binding strength
- Clean drawing from boxes
- Fewer core blow losses
- More accurately shaped cores
- Fewer defective castings
- Tough and flexible hardness
- Reduced smoke and gas
- Cores bake rapidly

Smith L-O Core Oil is obtainable in 20 grades, so as to meet varying job conditions, type of metal cast, and type of sand used. Order your requirements from the Smith representative in your territory.

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CORE WASH ROD DIP LIQUID PARTING

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INDUSTRIAL OILS DIVISION . . . ROCKFORD, ILLINOIS

IDENTIFICATION

In all the world, this thumb-print identifies only one individual —the one who made it. Just as this thumb-print identifies an individual, so FINE GRAPHITE, FOUNDRY FACINGS, CORE & MOLD WASHES, PIPE ELIMINATOR, and CARBON RASING GRAPHITE identify ASBURY GRAPHITE MILLS. We are in the second half of our first century of service to the foundry industry, and we still operate on the principle that a good manufacturer is always identified by good products.

ASBURY GRAPHITE MILLS

ASBURY, N. J.

PATTERN LETTERS

● **All standard styles and sizes of White Metal, Aluminum & Brass Pattern & Tablet Letters . . . . . Special Foundry Marks and Monograms to your specifications.**

Write for Wellman Letter Catalogue!

The **WELLMAN PRODUCTS** *Company*

PATTERN SHOP SUPPLIES
TOOLS and EQUIPMENT

1447 East 49th Street
CLEVELAND 3, OHIO

(*Concluded from page* 222)

ager for Wheelco Instrument Co. Wheelco Co. equipment and other lines will be distributed and a service department will be established.

* * *

General Electric X-ray Corp. has moved its main offices, laboratories and manufacturing plant from various locations in Chicago to 4855 West McGeoch Ave., Milwaukee 14.

* * *

G & C Foundry Co., West Monroe & Olds Sts., Sandusky, O., plans an addition to the foundry for the production of gray iron castings.

* * *

Pressure Casting Co., 21500 St. Clair Ave., Cleveland, plans construction of a new warehouse.

* * *

Liberty Brass & Bronze Foundry, San Francisco, suffered fire loss estimated at $6500 Jan. 15.

* * *

Massey-Harris Co. Inc., 1721 Packard Ave., Racine, Wis., plans to install a gray iron foundry in its plant.

STEEL FOUNDRY USES WOOD PLATE ON CORE BLOWER

(*Continued from page* 84)

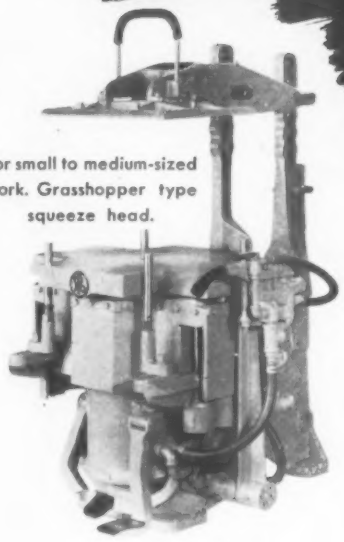
must conform to close tolerances, the sand must contain a considerable amount of green bond. The speed and force with which a core should be blown can be determined only through actual experience.

Through a gradual process of evolution core blowing machine manufacturers have settled upon three standard types of vents—the slotted type, the screen type and the hole type. Each of these has a distinct application. The slotted vent and the the hole vent are placed in the corebox at or near the area where the casting comes in contact with the core face. The screen vent usually is placed on a core print where it leaves a little mark that might be undesirable on the face of a casting. Air pressures from 50 to 130 psi have been tried, but general experience has proved that the ordinary line pressure in any foundry—from 70 to 90 psi—can be employed, provided the sand characteristics are suitable.

The small blow hole no longer is used, that is, a blow hole ¼ to 5/16-in. diameter. The usual size is ⅝ to ¾-in., exceptionally up to 2-in. diameter. Sand with a moisture content from 7 to 8 per cent can be blown

(*Continued on page* 226)

SPO No. 200 SERIES *Molding Machines*



For small to medium-sized work. Grasshopper type squeeze head.

For medium to semi-heavy work. Complete shielding against sand.

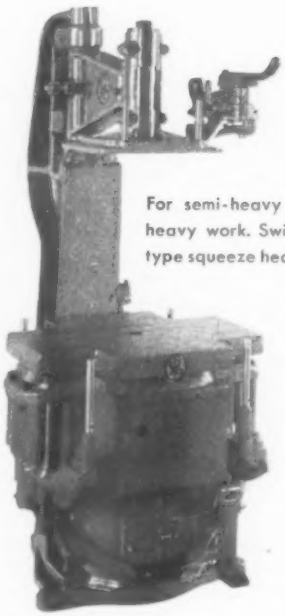
JOLT, SQUEEZE, STRIP—

1-2-3, JUST LIKE THAT —and almost as quick!

(1) Jolt; (2) squeeze on the *up-stroke;* (3) draw on the *down-stroke* ready to remove mold. *Could any set of operations be simpler?*

In other words: place flask over pattern, fill with sand and jolt, press lever to squeeze and strip mold automatically, remove finished half mold. Drawing pattern costs *no time whatever.* Perfect draw at breakaway and throughout operation, thanks to SPO's patented self-aligning stripping mechanism. Rugged and compact, adjustable to cover wide range of work; very few working parts keep maintenance next to nil.

SPO No. 200's are well known for the fast production of good molds. "Such popularity must be deserved."



For semi-heavy to heavy work. Swing type squeeze head.

For heavy work. Note clean understructure.

Write for bulletin giving range and capacities of these machines

MEMBER

SPO INCORPORATED

Manufacturers and Specialists in Molding Machines, Vibrators and Patterns for Production

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LOOSE PATTERN JOBS CONVERTED into MACHINE WORK with TAMASTONE

TAMASTONE SCORES AGAIN!

TAMASTONE makes possible 500% INCREASE

TAMASTONE SAVES THE DAY! Production Increased 600%

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DEPENDABLE FORGED & GROUND CHISELS

Hand and Pneumatic

Made to meet quality standards, not price requirements

SHANKS—Forged and Ground—Reduce breakage.

CUTTING EDGES—Hard—Tough—Increased cutting efficiency.

Best alloy steel made to our own specifications.

Skilled hammermen—Precise heat treating

Careful inspection—Complete service

Special tools made to blue print or sample

We welcome trial orders subject to your approval

BEDFORD TOOL & FORGE COMPANY

BEDCO

22 INTERSTATE ST.,

BEDFORD, OHIO

(*Continued from page* 224)

through the large opening. When the blow hole is small the moisture content of the sand must be watched closely. At one time or another wet and dry binders of all kinds have been tried. Probably the most difficult is fly ash. No one likes it but it works. The machine will blow practically any core sand mixture, but the most satisfactory mixture depends on the shape and size of the core. As an extreme instance the practice in a certain steel foundry may be cited where 250-lb cores are blown through twenty-seven 1¼-in. diameter blow holes.

The foregoing general observations based on published descriptions of core blowing practice indicate the situation in the Crucible Steel Castings Co. plant when decision was reached to use plywood blow plates. Size, position and number of blow holes and vent holes were determined by shrewd guess based on many years general foundry experience. Early experiments, if not entirely successful, at least were encouraging.

Establish Working Ratio

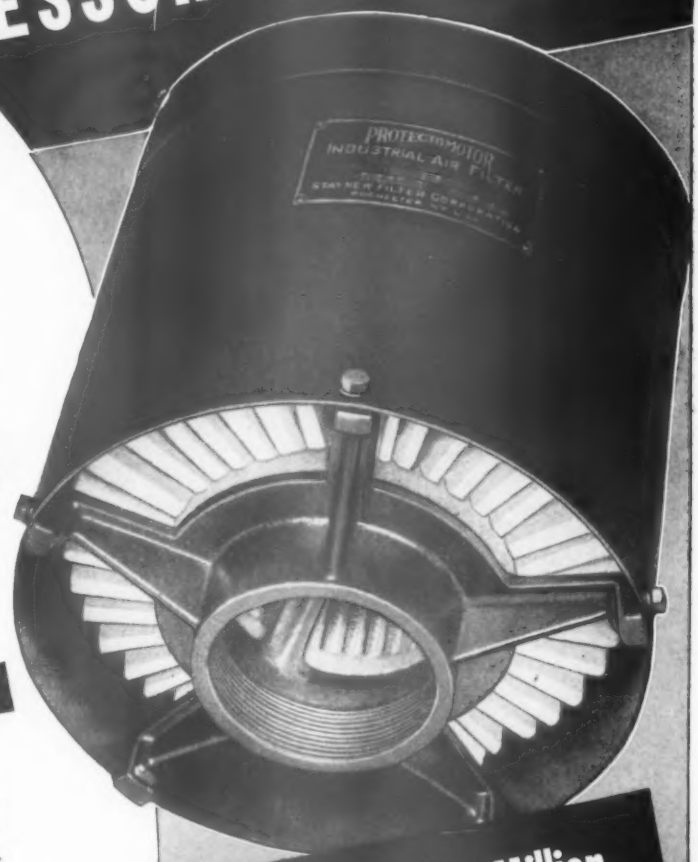
Gradually, as in many other forms of human endeavor, a sixth sense was developed which served as a guide in deciding the size, number and position of blow holes and vent holes. Work of former investigators has been confirmed to the extent that no definite ratio or formula has been established between the size and number of blow holes, and the size and number of vents. In actual practice the usual ratio is about 1 to 8; that is, the vent hole area is equal to 8 times the blow hole area. However, in exceptional cases satisfactory results have been obtained with ratios varying as widely as 1 to 1, up to 1 to 10. With few exceptions practically every corebox is a problem in itself.

Several typical plates, 16 x 24-in., are shown in Fig. 1. The recessed holes close to the edges are for the bolts by which the plate is attached to the machine. The small black hole or holes near the center are the blow holes through which the sand and air enter the corebox. The small white circles arranged in various combinations, are the vent holes through the lower part of the plate. A small slotted brass unit is press fitted in each opening. These devices hold the sand while the air escapes. The guide blocks on the face automatically locate the corebox in proper position in the machine.

The blow plate is in two parts, as

(*Continued on page* 228)

WHY PROTECTOMOTOR INTAKE FILTERS ARE BEST FOR AIR COMPRESSOR USE



★ HIGH EFFICIENCY WHEN INSTALLED

Protectomotor Air Filters for internal combustion engines and compressors feature dry-type filtering media. These media are selected to fit particular installation conditions. They have been scientifically tested in the laboratory and proven by field use. Used in combination with the patented Radial Fin Insert Construction, they provide highest operating efficiency.

★ INCREASED EFFICIENCY WITH USE

Protectomotor filtering efficiency actually *increases* when dust begins to accumulate on the surface of the media, since this forms a pre-coating or filter-aid of the very material which is being handled.

★ LOW RESTRICTION TO AIR FLOW

Protectomotors at maximum ratings offer initial resistance to air flow of less than ½" of water. Since the exclusive Radial Fin Construction provides a maximum of filtering area, this resistance is held to a minimum throughout the life of the filter.

★ SERVICING SELDOM NECESSARY

The Protectomotor is a masterpiece of simple, rugged construction. There are no moving parts, no reservoirs, no liquids. The extremely large active filtering area reduces cleaning to an absolute minimum for any given set of conditions. When required, cleaning is quickly and easily accomplished by vacuum, compressed air, or washing.

★ POSITIVE PROTECTION ★ ★ ★

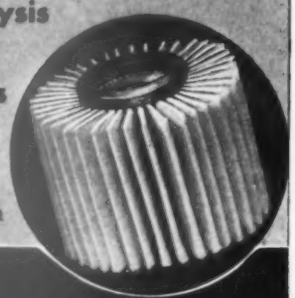
Inherent characteristics of the dry-type filtering media provide *positive* protection. Performance is *not* dependent upon periodic renewal of viscous coatings or other filter aids. Ideal for dust storm areas.

★ EFFICIENT AT HIGH OR LOW TEMPERATURES

As the filtering media used are of the dry-type, peak efficiency is maintained under all atmospheric conditions. There is no oil to evaporate at high temperatures or to congeal at low temperatures.

More than Half a Million Installations on Internal Combustion Engines and Compressors since 1920

Write for Catalog and Data Blank for Free Analysis of your Requirements



Radial Fin Construction

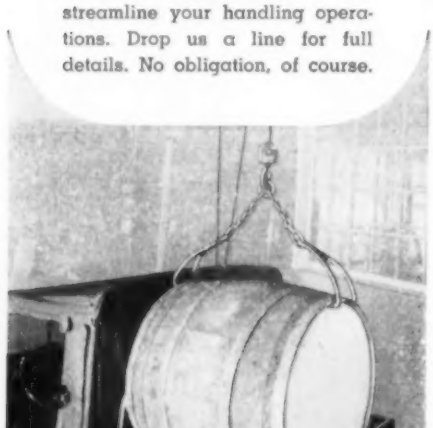
DOLLINGER REG. PROTECTOMOTOR U.S. PAT. OFF. STAYNEW FILTERS

DOLLINGER CORPORATION

36 Centre Pk., Rochester 3, N. Y.

HOW ONE PLANT
Streamlines
MATERIAL HANDLING

Here's another example that shows how you can get fast, low-cost materials handling, right now. Before installing a *Reading* engineered system, this plant had to wheel heavy barrels to the mill via hand trucks. To streamline the operation, *Reading* Engineers were called in. A one-ton Reading Electric Hoist, operating on a built-in parallel trolley, was recommended. Now barrels move faster—less manpower is tied up—and the entire operation costs far less!
Let Reading Engineers give you *practical* suggestions that can streamline your handling operations. Drop us a line for full details. No obligation, of course.



READING CHAIN & BLOCK CORPORATION
2108 ADAMS ST., READING, PA.

CHAIN HOISTS • ELECTRIC HOISTS
OVERHEAD TRAVELING CRANES

READING
HOISTS

(*Continued from page* 226)

shown in Fig. 2. The lower part, to the left is uniformly flat with the exception of the wide, shallow channels embracing all the vent holes and leading to the edges of the plate. In the construction of the plate, the upper half, a plain plywood slab, shown to the right, is attached to the lower half by four or six wood screws. A dowel pin near each end serves as a guide each time the plate is taken apart for any purpose and afterward reassembled.

While the two parts are together the blow holes and bolt holes are drilled according to the approved design. The upper part then is removed temporarily to permit drilling the vent holes in the lower part. A circle approximately 3-in. diameter is struck around each blow hole and then the outline of the vent passage, 2 to 4-in. in width embracing all the vent holes and leading to the outside of the plate is marked on the face. A routing tool removes the wood to a depth of ⅛ to ¼-in. in the marked space, with the exception of the 3-in. diameter islands around the blow holes. The upper part of the plate is returned to place, where the tightening of the wood screws bring the blow hole islands into close contact with the upper part of the plate. The device then is ready for use on the machine.

Make Plates In Pattern Shop

Plates readily are constructed in the plant pattern shop. Blow holes are slightly reamed or tapered at the top. Up to the present no necessity has arisen to reinforce them with cast iron or steel bushings.

Despite the fact that for a considerable period the plant has been operating above normal capacity, there has been no let down in the policy of neatness and good housekeeping. This is particularly noticable in the general appearance of the building and surrounding grounds. The center bay of the foundry is spanned by two traveling cranes which carry material, flasks, molds, cores, castings and ladles of metal from one place to another as required and without disturbing operations on the floor. Smaller cranes, traveling and stationary, electric and pneumatic, are available at strategic points. Employees do not do any heavy lifting. The fact that many of the employees are beyond their first youth, and that several have been on the job since the company moved from the original downtown site and commenced operation on a very modest scale in the present location about 20

(*Continued on page* 230)

USE
SCIENTIFIC
Pressure Cast
MATCH PLATES

COPE
AND
DRAG PLATES
UP TO
40" x 60"

The
SCIENTIFIC
CAST PRODUCTS
Corp.
1388-1392 EAST 40th STREET
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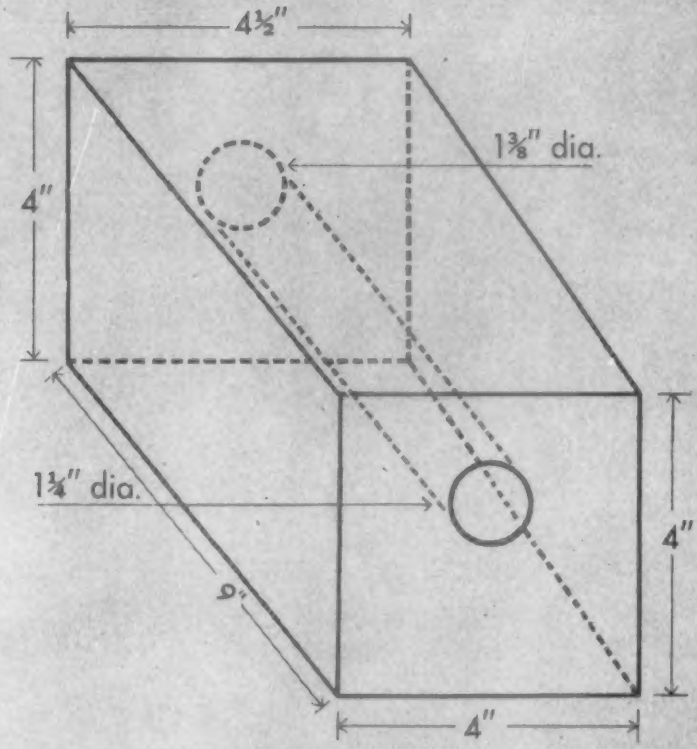
COSTLY SHUTDOWNS for Slag Hole Repairs CAN BE AVOIDED



● **Standard CARBOFRAX Slag Hole Blocks, in commonly called for dimensions shown, are available for immediate shipment. A variety of other sizes can be made to order from stock molds.**

Experience has proved that, in continuous-pour cupolas, slag hole troubles disappear when CARBOFRAX silicon carbide blocks are used.

In steady runs of 18 to 24 hours duration, their original hole size is maintained. No enlargement occurs during the blast. These hard, dense CARBOFRAX blocks are exceptionally resistant to slag erosion at high temperatures. With their low tendency to spall and crack, freedom from rapid block disintegration is provided. Expensive delays for slag hole replacement are eliminated.

Usually available from stock is the standard size of CARBOFRAX block shown in the diagram. Other sizes can be made to order. Many moulds are on hand for that purpose.

For detailed information write Department B-38, The Carborundum Company, Refractories Division, Perth Amboy, New Jersey.

CARBOFRAX Slag Hole Blocks

BY **CARBORUNDUM**

TRADE MARK

"Carborundum" and "Carbofrax" are registered trademarks which indicate manufacture by The Carborundum Company

for patterns, plates & matchplates, use

LECTRO-PAT

TRADE MARK

the aluminum alloy made especially for these exacting castings. Produced by the Cleveland Electro Metals Co., 2391 W. 38th St., Cleveland 13, O.

SYNTRON

CONSTRUCTION and MAINTENANCE TOOLS

Will Save You Money and Time!

—busting concrete, digging clay, shale and frozen ground; cutting asphalt and tamping backfill—with Gasoline Hammer Paving Breakers.
—drilling, cutting, chipping and scaling concrete and masonry—with Electric Hammers.
—drilling, sanding, buffing and polishing wood and metal—with Electric Drills and Sanders.
—grinding welds, snagging castings and wire brush work—with Electric Grinders.

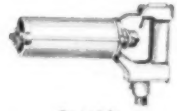
There are hundreds of "nuisance" jobs around your plant on which these Tools will save you time and money.

Write for illustrated folder.

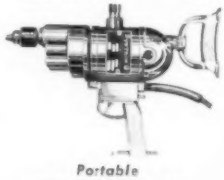
SYNTRON CO.

540 Lexington Homer City, Pa.

Gasoline Hammer
PAVING BREAKERS



Portable
ELECTRIC HAMMERS



Portable
ELECTRIC DRILLS

Portable
ELECTRIC GRINDERS

Portable
ELECTRIC SANDERS

(*Continued from page 228*)

years ago, would seem to indicate that the foundry is a good place in which to work.

With the exception of the large castings molded and poured in flasks on the floor at the south end of the main bay, all the other castings are made in green sand on two batteries of molding machines, one in the east and one in the west bay. These molds are made in snap flasks and placed on roller conveyors extending across the main bay. To minimize fatigue the molders on the west, or light battery, place their molds on a sectional type platform immediately back of and close to the machines. Each section of the platform is actuated by an air hoist which lowers the molds to the level of the roller conveyors and then returns to place. The conveyors have capacity sufficient to accommodate all the molds produced in the intervals between electric furnace taps. For pouring these castings the large ladle filled with steel is set up on stands. Metal is transferred to a 350-lb capacity ladle suspended from a light crane. A single operator manipulates the ladle from which the metal is poured over the lip into the molds.

Pans Are Dumped on Shakeout

After the molds are filled they are pushed forward to fall into a concrete wall pit 4 x 4 x 20-ft. The loads fall into steel pans provided with rings near the top corners for attaching the crane chains. Later the pans are dumped on the shakeout where the sand falls through the bars onto a belt which conveys it to a large storage tank above the mullers in the east bay. An air exhaust system removes smoke and steam from the shakeout unit.

Castings violently jolted on the slightly tilted shakeout gradually fall over the end and into a steel pan. Pan loads of castings later are transported by crane to the cleaning room at the north end of the main bay where they are loaded on cars and given varying degrees of heat treatment according to requirements. Plain carbon steel castings are raised to a temperature of 1650 F, held for an hour per inch of casting thickness, then lowered to a temperature between 700 to 800 F and withdrawn.

Medium weight castings are molded on a battery of machines in the east bay, south of the sand preparation installation. Majority of these molds are made in snap flasks considerably larger than those usually employed. Maximum size is 20 x 44 in., with cope 8-in., and drag 10 in.

(*Concluded on page 232*)

Foundries move more...faster... at less cost this NEW way

The BELL Prime-Mover*

"How'd we ever get along without it?" It's the sort of thing you hear over and over again in foundries that have adopted this new kind of work-speeder. The point is, *Prime-Movers* are doing *all* kinds of materials-moving faster, easier, and at less cost.

Prime-Movers unload, distribute and store sand in big 10-cubic-foot loads. They dump mechanically . . . climb 20% grades loaded, pass through openings 32" wide, and turn in their own length. Sideboards increase capacity to 18 cubic feet for bulky materials.

How about moving flasks, castings, and other materials? In a matter of seconds the *Prime-Mover's* bucket is replaced with a rugged half-ton platform body...without use of tools. For clean-up work and other pushing jobs, a blade attachment converts the *Prime-Mover* into a bulldozer or snow plow.

The *Prime-Mover* is so simple to operate you can entrust it to any workman after 3 minutes' practice. Less fatigue and better morale are valuable by-products of the *greater individual productivity* you get with *Prime-Movers.*

The *Prime-Mover's* engine, transmission and clutch run in oil, fully enclosed. No chains, no belts. One 3-gallon tank of fuel gives 8 hours' continuous use. Zero pressure tires available.

SEND COUPON NOW

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Please send me engineering and cost data on the *Prime-Mover,* including operating experience in ..... (type of work).

Name .....

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CLEVELAND

GREATLY IMPROVED STURDIER BUILT

SWIVEL CONNECTIONS

- Use as an intake connection on match plate vibrators to eliminate kinking and buckling . . . increase life of the hose.
- Eliminates wrist strain and permits greater freedom to the handling of rammers, grinders, hammers, etc.

ELL
or
STRAIGHT

Pipe Size		Hose Size
1/8"	x	3/8"
1/4"	x	3/8"
1/4"	x	1/2"
3/8"	x	1/2"
1/2"	x	1/2"
3/4"	x	3/4"
1"	x	1"

Delivery from stock!

CLEVELAND VIBRATOR COMPANY
2828 Clinton Ave.
Cleveland 13, Ohio

(*Concluded from page* 230)

deep. The molds are reinforced with steel jackets before they are filled with metal. A limited number of jackets is sufficient since they are shifted from mold to mold as in ordinary small snap flask practice. The molds are lifted from the machines by a crane and placed on a transfer car operating in a pit extending in front of the machines. The car is spotted in front of any desired conveyor line. The molds eventually reach the opposite end of the conveyor lines where they fall into pans in a long pit as in the first instance.

Large castings are molded in individual flasks on the floor near the south end of the main bay. Majority of the molds are coated with silica wash and skin dried with a torch. All the sand for the foundry is processed at a central station in the east bay. From this station a long belt carries the sand to the hoppers above the machines in the east bay. Sand for the other two molding divisions is distributed in tote boxes.

ALUMINUM ALLOY CASTINGS

(*Continued from page* 93)

to be immersed in the melt when the furnace is in operation. The iron tubes, of course, must be properly coated to prevent iron pickup by the molten metal.

Where burners are manually controlled, at least accurate temperature measuring equipment should be installed, as the temperature cannot be judged by the color of the molten metal. For this purpose thermocouples of the type just described may be used. By means of a switching arrangement, one indicating instrument may suffice for several thermocouples.

For checking temperatures in the pouring ladles, open-end thermocouples generally are used, as an iron protective tube would introduce too much thermal lag and thereby delay the measurements too long. No. 8 asbestos-covered thermocouple wires commonly are used, with a very short extension of the bare wires beyond the asbestos insulation. In use, the couple is immersed well into the melt so as to give an accurate measure of the internal temperature of the metal. The couple is simply connected through compensated leads directly to a millivoltmeter which is calibrated to read temperature directly. Both portable equipment that can be moved from furnace to fur-

(*Continued on page* 234)

"RAPID" MOLDING MACHINES

★

PORTABLE JOLT SQUEEZER R9X

WRITE for NEW BULLETIN "F"

PORTABLE HAND SQUEEZER R-10

PIONEER MANUFACTURING CO.

Molding Machine Manufacturer for Over 20 years

MILWAUKEE (West Allis) WISC.

SWAN-FINCH CASE HISTORY No. 225
(name on request)
Product: Grey Iron Castings with very thin metal sections.
Typical Core Mix: 100 qt. Silica Sand
1 qt. Safco 412 Core Oil
1 qt. Dry Binder
3.5% Moisture
Baking Time: 2 hours
Advantages: Safco 412 Core Oil used with the dry binder produced free venting cores with good collapsibility and hard, sharp corners necessary for proper casting of very thin metal sections.
Extra Benefits: Fast baking characteristics of Safco 412 Core Oil increased core production.

better castings, greater production

WITH SAFCO 412 CORE OIL

Here's an example of what was accomplished by a switch to Swan-Finch core oil. Similar results may well contribute to your foundry operations. The advantages indicated in this report are the result of a visit from a Swan-Finch Engineer . . . core binder tests on actual work . . . and a recommendation for a "custom-made" core binder that completely filled the bill.

However varied your foundry operations may be, a Swan-Finch Engineer, backed by the company's 95 years of successful experience in supplying specially compounded core binders—as well as cutting oils and maintenance lubricants—can make a recommendation for you . . . a possible lead to important production advantages and savings.

His visit will not interrupt your production, but may point the way to worthwhile saving. Send also for the new Swan-Finch Core Binder Bulletins.

SWAN-FINCH OIL CORPORATION

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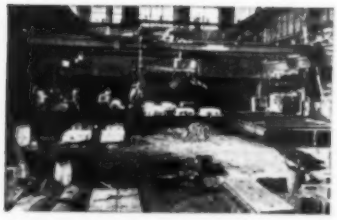
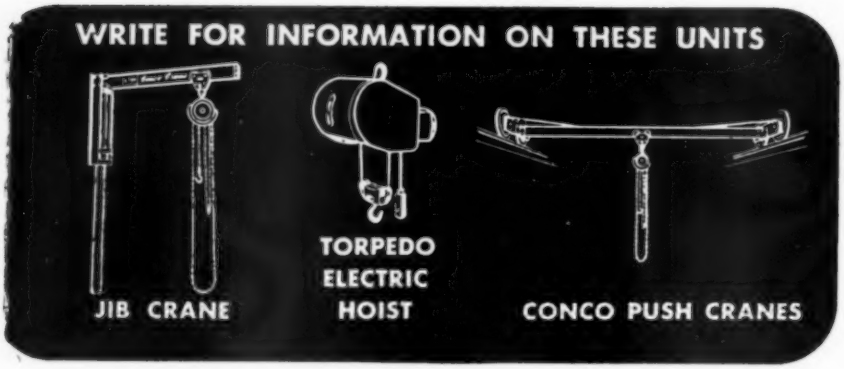
3865

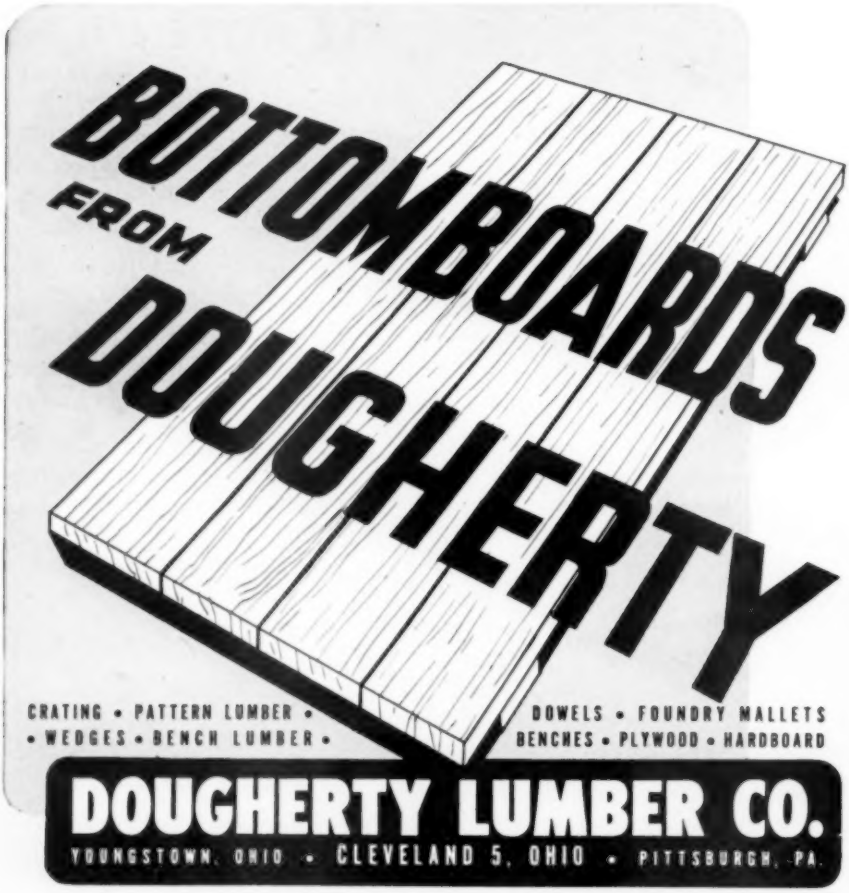
Conco FOUNDRY CRANES



● CONCO type DM Overhead Electric Crane moves materials swiftly, economically on a foundry floor. Write us for information on various CONCO Cranes, Hoists and Trolleys recommended for, and proved in, *foundry installations*. Our long experience enables us to recommend the right equipment, in the right size, for the right job.



CONCO ENGINEERING WORKS Division of H. D. Conkey & Co. 53 Grove St. — MENDOTA, ILL.


BOTTOMBOARDS FROM DOUGHERTY
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(*Continued from page* 232)

nace or from ladle to ladle and stationary equipment with several thermocouples and a selector switch are available. It is essential that all pyrometric equipment be carefully checked against suitable standards at periodic intervals.

Alloying and Alloy Ingot — For foundries large enough to compound their own casting alloys and suitably equipped for this operation, rich alloys of aluminum are available in pig or ingot form. These alloys contain relatively large percentages of elements that are difficult to introduce directly because of their low rate of solution in aluminum. Aluminum-titanium rich alloys and others also are available for grain refining purposes, as discussed later in this article. Compositions of some of the more common rich alloys are given in Table I. Other elements, especially those having a melting point no higher than that of aluminum, are easily introduced in commercially pure form directly into the melting furnace.

Aluminum of commercial purity contains about 99.5 per cent pure aluminum, the balance consisting of impurities, mostly iron and silicon. Guaranteed specific aluminum content of from 99.75 to 99.95 per cent is available at higher prices, but seldom is required for casting purposes.

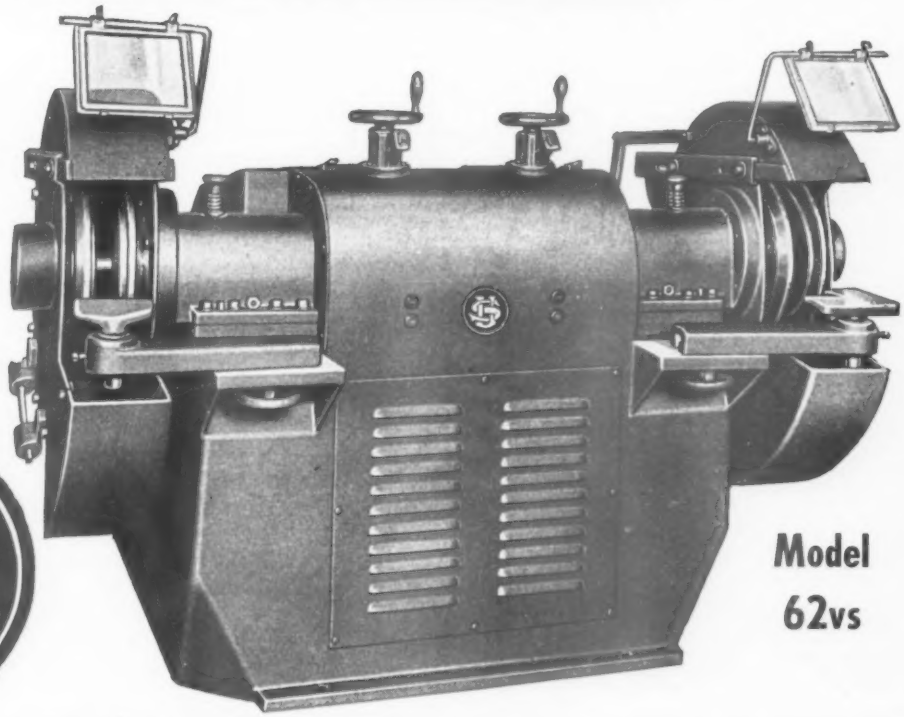
Upon correct compounding of alloys depends the physical and mechanical characteristics of the final castings. Therefore, foundries without adequate alloying equipment having close pyrometric control, or without a suitably equipped and staffed chemical laboratory, will obtain better results by purchasing alloy ingot rather than attempting to compound their own.

Alloy ingot is available over the entire range of compositions discussed in Article 2 of this series (January). These alloys will fill all ordinary and most special requirements. Where none of them will meet the needs of some highly specialized application, foundries will find the manufacturers ready to compound special alloys having the required characteristics. As this will result in a higher metal cost, however every effort should be made to use a standard alloy before asking for a special composition.

Clean scrap such as gates, risers and imperfect castings may be introduced directly into the alloying furnace along with other ingredients or into the remelting furnace. It is better, however, to handle scrap sep-

(*Concluded on page* 236)

INSURE PERFECT LOW-COST GRINDING IN YOUR FOUNDRY



Model 62vs

UNITED STATES DUAL MOTOR VARI-SPEED SNAGGING GRINDER

SHOP records from coast to coast in foundries large and small show amazingly low cost, satisfying high grade grinding with this machine . . . INCREASED PRODUCTION AND LONGER WHEEL LIFE.

FOR VITRIFIED OR HIGH SPEED WHEELS

Maximum peripheral speed can be maintained for the entire life of the wheel. *Wheel guards are adjustable to wheel wear,* interlocked with speed changer. Totally enclosed fan-cooled ball bearing motors. Push Button stations on front of pedestal. Heavy chrome-manganese spindles operate in heavy duty ball bearings which are enclosed in dustproof housing with inner and outer oil seals.

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The UNITED STATES ELECTRICAL TOOL *Co.*

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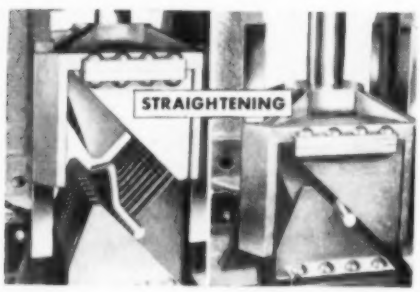
HAND YOURSELF

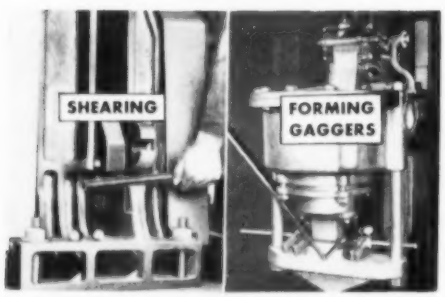
A MONTHLY DIVIDEND

The American Rod Straightener has proved itself a real dividend payer. Substantial savings of time, labor and materials are being effected by its use in hundreds of foundries. The machine is easy to operate . . . in most cases being run by unskilled labor . . . . and works as fast as material can be fed into it. Four models are available to fit your needs.



The machine makes scrap piles a thing of the past. Bent core rods are quickly salvaged, permitting their reuse many times. As rods are fed into the machine they are struck at four points simultaneously, and straightened by the action of one blow. See photo above. The shearing of rods to size and the forming of gaggers are illustrated below.

Write for Bulletin 10-B.



American
WHEELABRATOR & EQUIPMENT CORP.
(FORMERLY AMERICAN FOUNDRY EQUIPMENT CO.)
505 S. Byrkit St. Mishawaka, Indiana

CORE ROD STRAIGHTENER

(*Concluded from page* 234)

arately and cast it into ingot form for later use. Obviously, all scrap should be kept carefully segregated so that the composition of individual collections is known.

Borings, chips and turnings are likely to be coated with moisture, oil and grease. In addition, because of the large ratio of exposed surface to volume, the oxide content of such scrap is high. Special treatment and equipment are necessary in melting such material to insure good quality metal. Usually moderate heating before melting will drive off surface contamination such as oil, grease and moisture. Heavy fluxing after the scrap is melted, as described in a later section of this article, usually will remove the oxides and gas.

Some foundries pass hard-to-handle scrap through hammer mills which chop up the pieces of various sizes and shapes and reduce the material to a uniform size. For best results such scrap should not be handled in foundries, but should be refined and treated by smelters capable of producing the alloys shown in Table II of Article 2 of this series.

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1. *Practical Metallurgy.* George Sachs and K. R. Van Horn. ASM, 1940.
2. "Effects of Minor Alloying Elements in Aluminum Casting Alloys." Walter Bonsack. ASTM *Bulletin* Part I, August, 1942; Part II, October 1943.
3. *Casting Alcoa Alloys.* Aluminum Company of America, 1947.
4. "Melting of Aluminum and Aluminum Alloys." T. W. Bossert and H. J. Rowe. Nonferrous Melting Practice, AIME, Institute of Metals Division, 1946.
5. *Process Control of Aluminum Foundry Procedure.* SAE, 1945.

Editor's Note: The concluding discussion of aluminum alloy melting and pouring practice will be presented next month. Subsequent articles will cover permanent mold practices, casting design, cleaning and finishing of castings, heat treatment, and inspection and quality control.

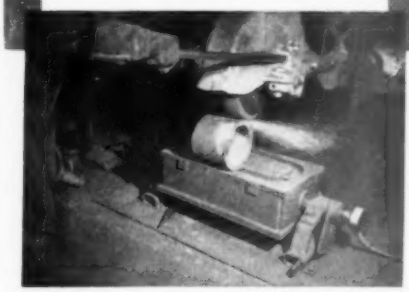
CHURCH BELLS ONCE CAST ON THE SITE

(*Continued from page* 81)

casting on site of a really large bell is that of a former "Great Tom of Lincoln," 9000 pounds cast in the Minster Yard in 1610. Two founders worked in temporary partnership, Oldfield of Nottingham and Newcombe of Leicester, owners of successful established foundries in their respective towns. Possibly the reason for this pooling of experience was because each considered the casting of a 4-ton bell "on site" too big a job to handle individually. Perhaps the Minster authorities deemed it wiser to have two well known founders working in collaboration.

(*Concluded on page* 238)

THERE'S ROOM FOR COST REDUCTION IN SWING GRINDING



DINGS HOLD-TITE ELECTRO-MAGNET

Reduces set-up time . . .
Decreases grinding time . . .
Helps production planning . . .
Increases grinding wheel life

Steel and iron castings of any shape or weight are held securely in position under a swing grinder with Dings Hold-Tite Magnet—eliminating need for blocking, wedging or clamping. Firm hold on piece increases wheel life. Over-all grinding time is reduced 25% or more—with benefits of lower unit labor costs and less operator fatigue. Also makes possible better production planning because grinding times become more standard. Magnet has easily renewable wearing plate. Available with or without trunnions which allow tilting to seven positions by foot lever. Available for 115 or 230 volts D.C. with hand or foot switch. Built in two sizes: magnet face 16" x 29½" or 16" x 16" Write for full details.

Other Features:

- Wound for continuous duty with glass-insulated wire. Long life.
- Low operating cost—only 290 watts for small size—475 watts for large size.
- Simple and sturdy construction . . . easily installed . . . negligible maintenance cost.
- Extra strong magnetic holding power.

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Dings
"HIGH INTENSITY"

Cast Iron

JACKETS

Are Best by Test

FREMONT MAGNESIUM FLASKS

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STURDY...

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BUILT FOR LONG SERVICE AND FAST PRODUCTION

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Sahara Heat-Resisting Beltings For Handling Hot Materials

Foundries have used Sahara Beltings for over 25 years because they are unexcelled for conveying and elevating hot materials.

Standard Sahara is for handling materials up to 300° F., **Insulated Sahara** for use where sustained temperature of materials is from 300° F. to 450° F. Their heat-resisting qualities are due to special impregnation and insulation. Their base is a 37½ ounce, tight-woven duck with a tensile strength exceeding 700 lb. per inch of width. Our double-stitched and Inner-Locked construction permanently prevents ply separation.

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Imperial INNER-LOCKED BELTING

Imperial Belting Co.

1755 S. Kilbourn Ave. Chicago 23, Ill.

Engineered Belting—
The Right Belt for Each Job

(*Concluded from page* 236)

In olden times the casting of a bell within the precincts of a religious house was accompanied by much ceremonial; Southers, in *The Doctor* describes the scene:

"The brethren stood round the furnace, ranged in processional order, sang the 150th Psalm, and then after certain prayers, blessed the molten metal and called upon the Lord to infuse into it His Grace, and overshadow it with His power, for the honour of the Saint to whom the bell was to be dedicated, and whose name it was to bear."

One readily can visualize the medieval scene: The founder busily engaged directing his assistants and generally supervising; the villagers gazing in wonder at the rare spectacle; the parish priest moving among the assembled throng and exchanging a word here and there—all eagerly awaiting the day when the new bell would be hoisted proudly to its place in the bell tower. Henry Bagley, an 18th century bellfounder, published in 1732 a catalog of bells he had cast. He also expressed his willingness to cast bells where required: "*N.B.—The said Henry Bagley will, (if desired) cast any Ring or Rings of Bells in the town they belong.*"

In 1762 the great bell of Canterbury Cathedral, 7840 pounds, was cast on site by the White Chapel Foundry.

The itinerant bellfounder was equally known in continental Europe. The *fondeur ambulant* traveled over France until as late as the middle of the last century. Berthele refers on several occasions to the activities of the traveling bellfounder in his work *Enquetes Campanaire*. He mentions the employment of 120 men on the occasion of casting a particularly large bell. In passing, it is interesting to note that there are very few instances of any other large castings —except perhaps cannon—having been cast on site. Berthele (p. 566) mentions six pieces of artillery, four of 1000 pounds weight cast by Francois Rene Giullaume, *artiste fondeur* of Rennes. There were cast in 1792 "*a'Tours dans l'ancien cloitre de Saint Julien.*"

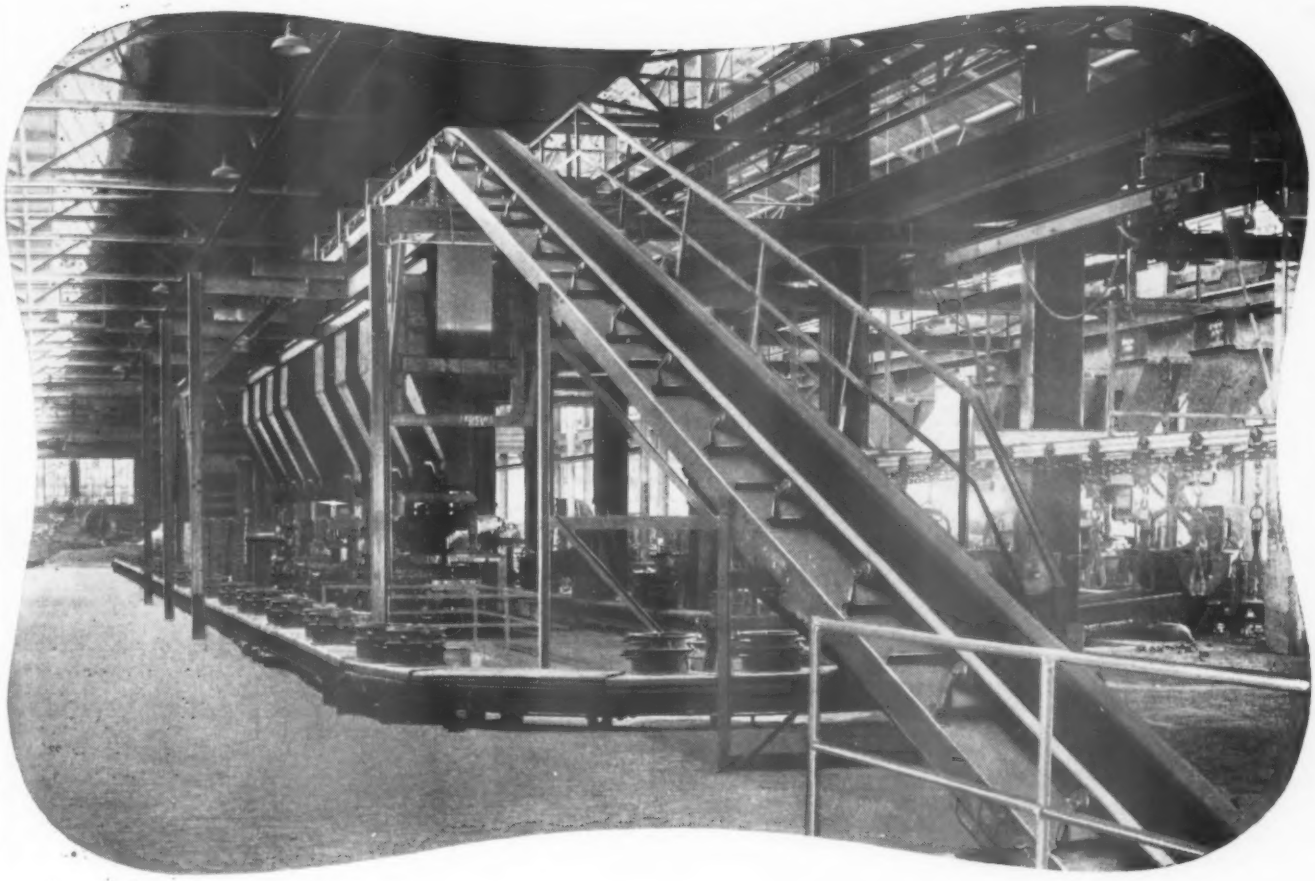
It was not uncommon for medieval —and later—bellfounders to turn their attention to the casting of cannon. Robert Mot, who established the famous Whitechapel (London) Bellfoundry *circa* 1570 also cast cannon for Queen Elizabeth's ships of war at the time of the Spanish Armada. The bellfounders' activities in this direction also are shown in the foundry mark (Fig. 1) of some 15th century bellfounders of Bury St. Edmunds.

Numerous instances could be given of bells broken to be made into cannon and—*apres la guerre*—of cannon recast into bells. At Liversedge, Yorks, a complete ring of bells was cast from cannon. One bears the following inscription: THESE EIGHT BELLS WERE CAST IN 1814 AND 1815 WITH BRASS ORDNANCE TAKEN AT GENOA.

An interesting memorial to a bellfounder is in the beautiful stained glass window in York Minster. This is "The Bellfounders' Window" a gift of Richard Tunnoc, bellfounder, and member of Parliament for the city of York. This window shown in Figs. 2, 3 and 4 is intended to portray the processes of molding in medieval days. The following description is given in Ellacombe's *Bells of the Church:*

"On the left hand is represented the mode of forming the mould of the bell, called the core. One figure is turning it with a handle like a grindstone; and another, with a long crooked tool (which he holds firmly with both hands, one end being placed under his right armpit), is molding the clay to its proper form. . . . On the floor of this compartment are shown two bells, between the legs of the tressels on which the mould is being turned. In the compartment on the right hand (shown here in the center. Ed.) there are three figures, busily engaged in running the molten metal. The furnace is of an ecclesiastical type, in which the metal is kept heated by two pairs of large domestic bellows, worked by a boy who holds a handle in each hand; another boy is helping him by standing with one foot on each upper board of the bellows, on which he manages to support himself and regulate his movements by holding on with one hand to a bar just above his head. The other figure, we may suppose, represents the chief workman, who, having tapped the furnace, is carefully watching the molten metal running into the mould below." Fig. 4 shows the bellfounder receiving the Bishop's blessing.

Fig. 5 shows an illustration of a medieval furnace, taken from an old book, *Diversanum Artum Schedula* written by one Theophilus Presbyter. The sketch is in several points comparable to the York Minster window. The false bell or clay bell is seen on the right side. The same operation is shown in the York Minster window. The furnace in the sketch is provided with six pairs of bellows operated by hand lever. In the York memorial only two pairs are used.



Upping Production and Morale

Overhead return of sand, conditioned mechanically to a constant predetermined temper, relieves the molders of tedious lifting, bending, shoveling,— and reduces your own headaches, too. Individually engineered to your particular and individual requirements, Bartlett-Snow sand, mold and castings handling equipment will give you a maximum of both quantity and quality from your plant. Costs go down. Your product finds readier sale. The workmen get larger take home pay—easier—like their jobs better. Absenteeism and turnover are much reduced. And the smoother, more even, more continuous production means bigger profits, larger dividends for you. Can we send you more details?

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ENGINEERING REPRESENTATIVES IN THE PRINCIPAL CITIES

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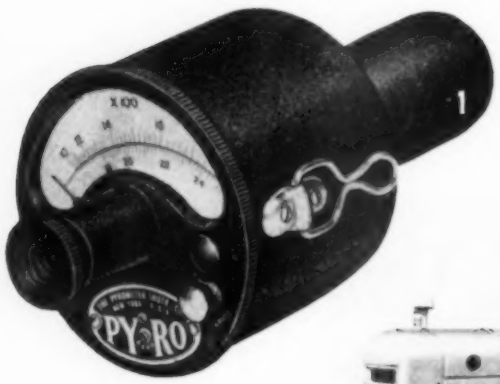
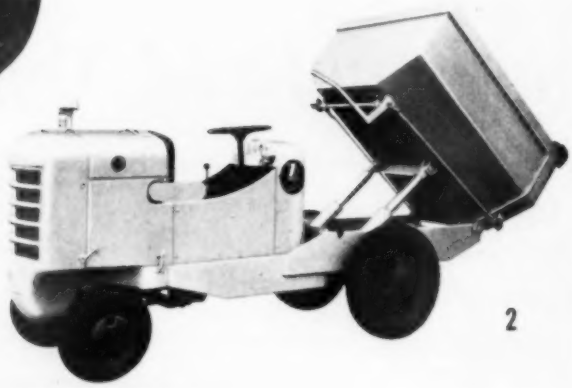
New Equipment and Supplies

(1)—Pyrometer: Pyrometer Instrument Co., 106 Lafayette St., New York 13—Radiation pyrometer is designed to determine temperatures above 1000° F by thermo-electric principles. Instrument is self-contained, weighs less than 2 lb and has direct reading scale with indicator locking device which holds pointer at reading obtained until released to zero position by a push button. To obtain a temperature reading, the instrument is simply sighted at the object being measured. Principle of operation of the instrument is based on the laws of radiant heat. Encased in a steel housing, the instrument is durable and is said to be immune to external magnetic and electrical influences.



1

(2)—Hauling Unit: Frank G. Hough Co., 703 Sunnyside Ave., Libertyville, Ill. — Gasoline engine powered, four-wheel hauling unit, known as the Payloader Buggy, has a 2 cu yd capacity and hydraulically dumped body. Overall height of the unit is 5 ft, 8 in., and it has a short wheel base and rear wheel steering for easy operation in narrow doorways and aisles. Hauling body is long, low and wide to facilitate loading by cranes, tractor shovels or by hand. Loads are dumped by hydraulic power. Unit has two forward and two reverse speeds and is equipped with hydraulic brakes and pneumatic tires.


2

(3)—Power Bucket: Bell Aircraft Corp., P. O. Box 1D, Buffalo 5—New materials handling device is designed to carry 1000 lb of wet or dry materials and to climb a 20 per cent grade with full load. Called the Prime Mover, the machine has three wheels. Powered by a 3-hp air-cooled engine, it will operate for 8 hr on 3 gal of fuel. Transmission, clutch and gears are enclosed and no belts or chains are used to transmit engine power. The 10-cu-ft capacity bucket is interchangeable with a platform deck without use of tools. Both the platform and the bucket dump automatically, then return to a level, locked position. Snow plow attachment also is available. Unit weighs approximately 400 lb, is 35 in. high, 63 in. long and 31½ in. wide.

(4)—Heater: Young Radiator Co., 709 Marquette St., Racine, Wis.—New type circular, vertical discharge type unit heater is said to increase heating efficiency, reduce operating noise to a minimum and save 35 per cent in total unit weight. The motor is cooled by "open stack" ventilation. Motor is mounted in a stack open at both ends at the center of the circular heating core. Fans draw room air through the open ventilating stack, and direct air taken from the heated core downward through the fan opening. This provides a flow of air around the motor which is said to reduce motor operating temperature as much as 75° F. When motor is off, core-heated air rises and,

(*Continued on page* 242)

3

4

For the Foundry: MOLD CONVEYORS • FLASK FILLERS • BUCKET ELEVATORS
PADDLE MIXERS • SCREENS • BIN VALVES • CONVEYORS • AERATORS • SANDITIONERS

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The NEW Strand Rotoflex 4-speed gear drive Flexible Shaft Machine (shown upper right) is another step forward in Strand quality precision tools for faster, easier, more economical production work. The Rotoflex 4-speed gear drive employs a patented, new type of quick change gear drive utilizing 4 positive speeds by a unique and easy method of instantly changing from one speed to another. Rotoflex machines are powered with totally enclosed ball-bearing motors having speeds from 850 to 9000 R.P.M., depending on motor.

Standard type Strand machines, (lower right) give portable rotary power at constant speeds with dependable results in all grinding, buffing, drilling, wire brushing and rotary filing operations. Hundreds of types and models from ⅛ to 3 H.P. available with suitable attachments for your specific requirements.

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Strand FLEXIBLE SHAFTS

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CHICAGO 40, ILL.

(*Continued from page* 240)

in passing over the top opening of the ventilating stack, forms a natural draft. Thus, cooler room air is drawn up through the stack, providing continuous motor cooling. Seven models of the heater deliver from 52,600 to 552,000 Btu's per hour under standard operating conditions.

Water Bath: Harry W. Dietert Co., 9330 Roselawn Ave., Detroit 4—Constant temperature water bath for operation below room temperature is designed for use with the hydrometer method for obtaining particle size distribution. It is equipped with solenoid water valve, motor-driven

water circulating pump, and thermostatic control. Cool water is admitted by the solenoid valve, as required, to maintain the desired temperature. Bath is said to operate between 32°F and room temperature to an accuracy of 1/2-degree. Dimensions are 12 x 20 x 24 in., which provides room for eight 1-liter graduated cylinders.

Welding Machine: Wilson Welder & Metals Co. Inc., Dept. 1609P, 60 East 42nd St., New York 17—Motor generator arc welding machine is available in 200, 300 and 400 amp models. It is designed for either 220 or 440 v with no change in relays or additional wires being required for voltage reconnection. It is designed to furnish a smooth steady current for every industrial welding job. Machine is of weather-resistant, totally enclosed, drip-proof construction with moisture-proof insulation.

Metallizing Gun: Vande Mfg. Co., 1837 South Michigan Ave., Chicago 16—New metallizing gun is designed for fast and thorough application of steel, aluminum, zinc, lead, bronze, copper, nickel and other metals. Among the new developments incorporated in the gun are a nozzle

(*Continued on page* 244)

HOT-HOT-HOT

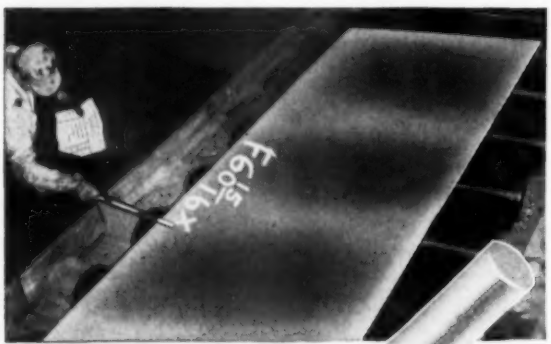

Illustration shows plate being marked at 1800°.

Mark HOT CASTINGS with MARKAL PAINTSTIKS

IDEAL FOR marking all types of HOT or COLD metals.

MARKAL "A" For annealing, welding, hot castings and "stickers" at the open hearth. Temperature range—60°F to 1200°F.

MARKAL "H" For hot castings, plates, slabs, billets, castings and forgings. Temperature range—150°F to 1400°F. Parts can be immersed immediately in cold water bath without defacing markings.

MARKAL "HT" For extremely hot surface markings. Temperature range—250° to 1800°F. Dries instantaneously.

MARKAL "M" for marking metal surfaces from 0°F to 160°F which are subsequently to be annealed at various temperatures up to 1800°F. Marks withstand immediate quenching in water or oil.

Marks will not "run", "char", "flow", "discolor", "peel" or "crack." Marks are FADE-PROOF, WEATHERPROOF, PERMANENT.

Also types for cold surfaces — Tell us your marking problems We will solve without obligation. — *Write for FREE SAMPLE*

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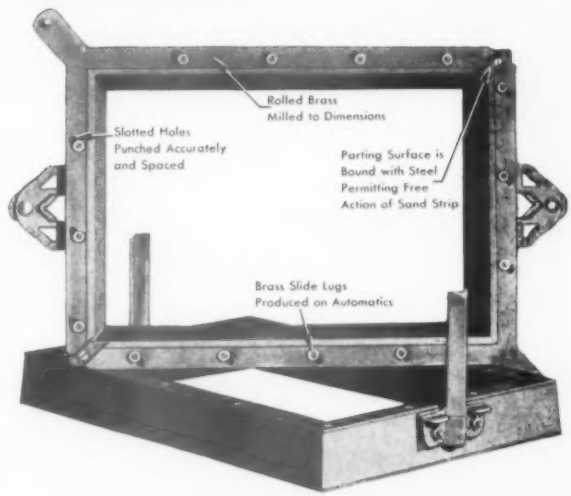
foundry flasks

with precision-made 100% machined sand strips . . . another advance by Diamond. *Write for bulletin "F" for complete details.* And note this: we can make prompt delivery!



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Telephone 2553 CLAMP AND FLASK COMPANY Richmond, Indiana

Designers of CORE PLATES, JACKETS, BANDS, FLASKS *since 1889*

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highest foundry quality
Prompt shipment—unlimited quantities now available to foundries from BAROID—the world's largest producer of bentonite. Our modern plants are geared to fulfill every requirement of the foundry trade.
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GAS OR OIL FIRED
WITH RECIRCULATING
AIR HEATERS

UNIFORM CORES CONTINUOUSLY
WITH LOW COST OPERATION
Strictly a *production* unit—note that all drawers operate independently of each other. Comes completely equipped with latest type temperature indicating controls (variable 100° to 650° F) and high efficiency recirculating air heater. Sturdy construction with 4-1/2" fibre-glass insulation throughout. Users commend Porbeck ovens for their space and time saving features. Available in several types and sizes. We invite your inquiry.
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PORBECK MANUFACTURING CO.
Manufacturers since 1894 of Core Ovens, Mold Dryers, Processing Ovens, Mold Drying Ovens, Heat Treating Ovens, and Paint Baking Ovens.
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(*Continued from page* 242)

which mixes gas and oxygen at the point of combustion. Backfiring is said to be eliminated. Each wire nozzle is designed to provide the exact volume for the gas used—acetylene, propane, or other gas. Turbine control is achieved by a compound turbine containing a rotor and stator responsive to opposing air jets. One of the jets is controlled by a finger-tip lever and reduces or increases the primary turbine speed, affording complete wire feed control.

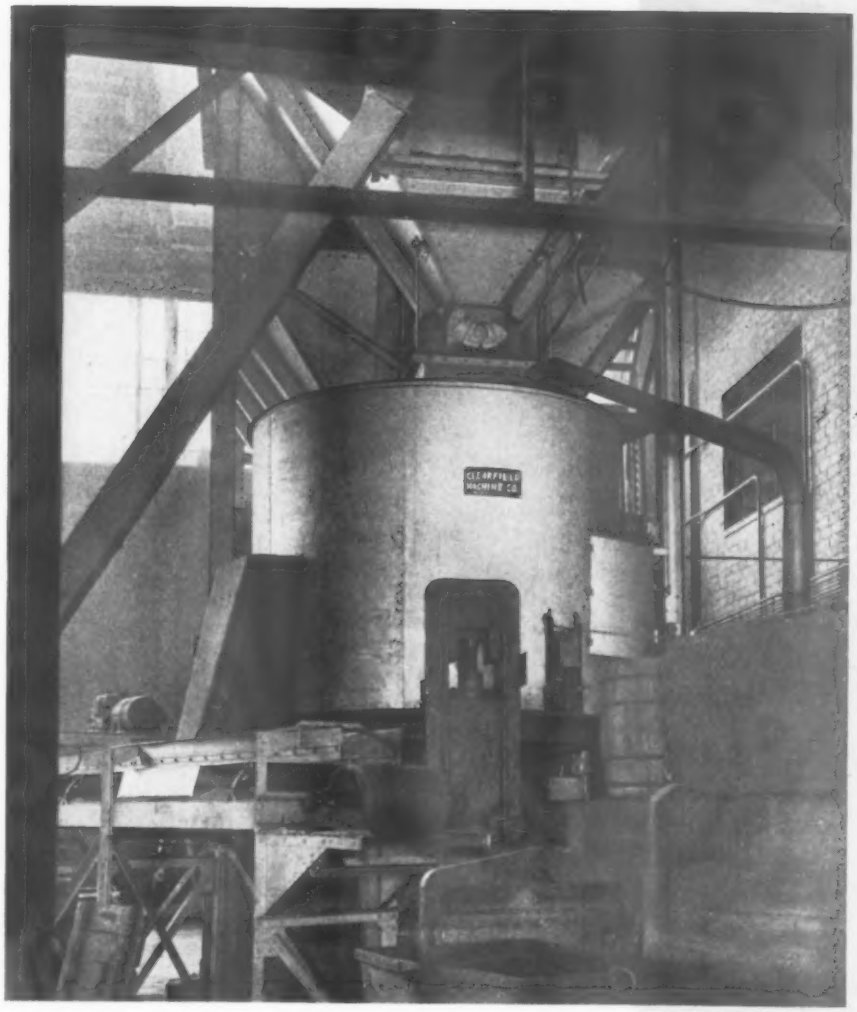
Refractory Coating: Whitman Co., 1407 Esperanza St., Los Angeles 23—Coating is designed to prevent spalling action, resist heat penetration and decrease carbon, slag

and clinker adherence in fire boxes, furnaces and crucibles. It forms a semiglazed protective monolithic wall described as from 8.5 to 9 hardness (diamond is 10-Mohs scale) between fire and fire brick that is said to be impervious to heats up to 3390° F and to withstand the destructive effects of flame impingement and abrasion. It comes in powder form, is mixed with water and may be brushed or sprayed.

Oven Heater: Newcomb-Detroit Co., 5741 Russell St., Detroit 11—Direct gas-fired heater is a packaged heating system within itself. It mixes the products of combustion

directly into the air stream, and main and pilot burners are approved enclosed pressure type using low pressure combustion air. There is no open flame in the production department and positive control is provided. Heaters are available in 5000, 10,000, 15,000 and 20,000 cfm air ca-

(*Continued on page* 246)



More than 70 TONS per hour

of gray iron molding sand

More than 70 tons per hour—well over a ton a minute—of perfectly prepared gray iron molding sand is being turned out consistently by this and similar Clearfield units. There are no sand-caused production lags when a Clearfield is on the job.

No matter how large or how small your sand preparation needs, Clearfield mixers offer the efficient, economical solution. Write today for Catalog No. 79 for complete information.

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March, 1948

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United States, Canada & Mexico

Gentlemen:

What does your Labor Productivity picture look like for 1948? Will you be able to meet union demands for "ANOTHER ROUND OF WAGE INCREASES" out of your PROFIT MARGIN, or, must INCREASED WAGES come out of INCREASED PRODUCTIVITY of your workers?

If your answer is the latter, we would like an opportunity to tell you HOW through controls and techniques, applicable even to small departments, you can keep one foot on costs despite rising wages.

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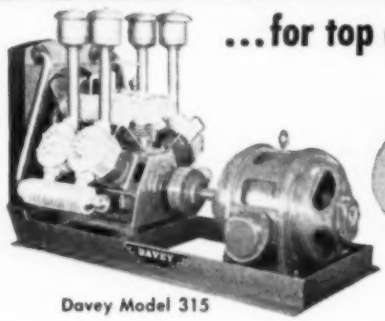
Surveys Reports Layouts Cost & Production Control Systems Work Flow Charts
Wage Incentives Supervisory Incentives Plant Appraisals Operation Audits



...for top air output *plus* economy

SPECIFY DAVEY DEPARTMENTAL *Compressors*

Davey Model 315

DAVEY DEPARTMENTAL COMPRESSORS GIVE YOU THESE ADVANTAGES

- Power savings
- Lower air losses
- Maximum air operating efficiency
- Make plant expansions easy and economical
- Eliminate shutdowns due to compressor failures
- Air cooling eliminates water bills
- Ease of installation
- Reduced maintenance and replacement expense

IN LINE with today's trend toward employment of small departmental compressors instead of one large centralized machine, Davey offers a complete line of industrial units.

These are available in 60, 105, 160, 210 and 315 c.f.m. capacities. And every Davey has GUARANTEED LIFETIME VALVES.

DAVEY COMPRESSOR CO. • KENT, OHIO

Write for Bulletin E-219

DAVEY

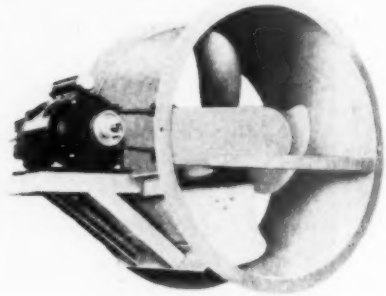
P&P-102

DAVEY COMPRESSOR CO. *Dealers in Principal Cities*

(*Continued from page* 244)

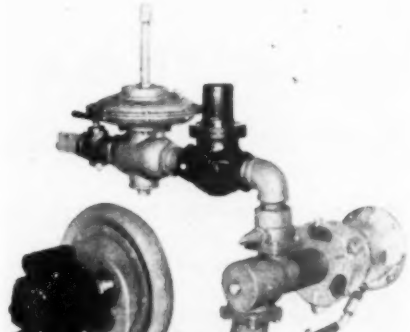
pacities with burner capacities from 250,000 to 4,000,000 Btu's—larger sizes on request.

Booster Fans: Chelsea Fan & Blower Co. Inc., 1200 Grove St., Irvington, N. J.—Booster fans for use in paint spray booths, removal of fumes and where there is excessive



heat are said to be ruggedly constructed and extremely quiet in operation. Fan shafts and motors are ball-bearing mounted; blades are made of nonferrous metal. Fans are designed for either vertical or horizontal operation. They are available in five sizes with propeller diameters of 16 to 36 in., capacities from 2000 to 9500 cfm and ¼ to ½-hp motors.

Combustion Assemblies: Industrial Division, Bryant Heater Co., 120 London Rd., Cleveland 10—New line of pre-engineered gas combustion assemblies combine air han-



dling, gas supply, mixing and burning elements and are built as single burner units, although they can be supplied with twin nozzle burners. Units are available in eight capacities from 400,000 Btu/hr rated at 8 boiler hp, with a 1½-in. gas inlet and ⅓-hp blower; to 3,300,000 Btu/hr, 66 boiler hp, a 3-in. gas inlet and 3-hp blower. Units burn any low pressure gas from 400 Btu upwards, at 3 in.

(*Concluded on page* 248)

IRONTON BERLITE

May We Send You Our New Bulletin on "IRONTON BERLITE"

"Ironton Berlite" is the most successful ladle lining material available at this time. Its very high refractoriness, freedom from shrinkage and super-resistance to slagging, enables it to last much longer than ordinary ladle mixes. Every foundryman who uses "Ironton Berlite" is enthusiastic about its performance and will recommend it to his friends.

"Ironton Berlite" is a dry, pulverized material. Just mix it with water to the desired consistency and it can be used for either tamped or mud linings in iron foundry ladles. It is also used as a mortar for laying brick in brick lined ladles, and for laying up cupola blocks in the well and melting zone.

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General Purpose
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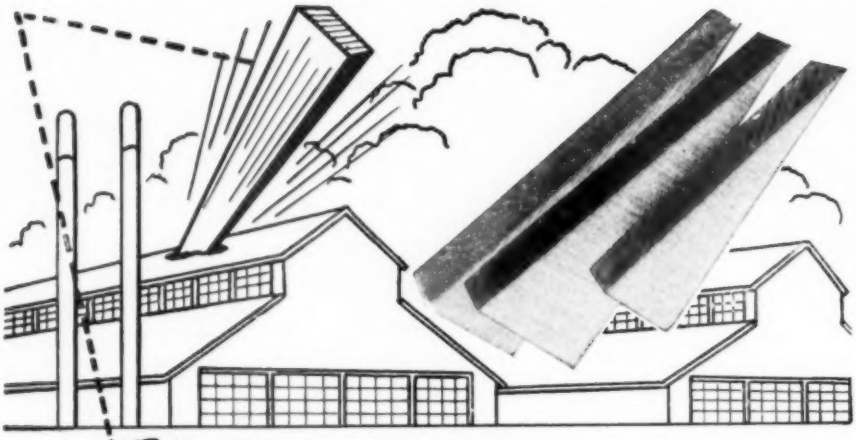

Wedging THEIR WAY INTO MORE AND MORE FOUNDRIES!

A wedge splits . . . the clamp slips . . . and another casting bites the dust. If you're out to save time and money, this is one foundry headache that can be eliminated by using STERLING HARDWOOD FOUNDRY WEDGES. Made in three standard sizes. Packed in burlap bags. Available for prompt shipment at a cost cheaper than you can make your own.

Consult Sterling when in need of foundry equipment — flasks — clamps—bushings—core plates—wheelbarrows—carts—trucks, etc.

Sterling
FOUNDRY EQUIPMENT
STERLING WHEELBARROW COMPANY • MILWAUKEE 14, WIS., U. S. A.

A 5223-1/6

(*Concluded from page 246*)

to 11 in. water column. A single, easily locked adjustment sets the air/gas ratio.

Welder: Hobart Brothers Co., Hobart Square, Troy, O.—New alternating current welder is designed for use with modern "Heliarc" equipment supplied by Linde Air Products Co., 30 East 42nd St., New York 17

using helium or argon for inert gas shielded welding. Welder has high frequency stabilization which is said to insure easy starting and dependable maintenance of the gas-shielded arc with practically no rectification of the current passing through it. Pressing foot pedal starts arc through the tungsten electrode and opens valves permitting the shielding gas and the cooling water to flow through the torch. Releasing the pedal breaks the arc, but permits gas and water to continue flowing for a predetermined length of time, adjustable up to 180 sec.

Oil Burner Control: Combustion Control Corp., 77 Broadway, Cambridge 42, Mass. — Oil burner programming control is designed to provide automatic starting and programming control for commercial and industrial oil burning equipment. It is used with a photoelectric flame failure scanner which protects the oil burning installation from flame failure hazard. The control automatically starts a burner in operation and programs a sequence of fuel valve opening, post-ignition time, priming and scavenging.

Chipping Hammer: Atlas Welding Accessories Co., 707 East Lewiston, Ferndale, Mich.—Chipping hammers have hand-forged heads which are drilled halfway through and the handles silver brazed into the hole. Heads are said not to come off. Handles have sting-proof coiled wire grip which minimizes danger of burning and breakage.

IMPROVED AO FOUNDRY GOGGLES

In safety goggles, protection *alone* isn't enough! That's why AO makes the NFA Foundry Goggle in two sizes to fit large faces and small . . . builds in a pliable corduroy binding that softly "drapes" the entire edge of a genuine horsehide leather mask that's soft in itself. Combined with a one-piece, easily adjustable headband, the result is a snug, safe, non-slip fit. Fogging is no problem — wire screen ventilators let air *in* — keep sparks and flying objects *out.* For operations such as melting, pouring, chipping, grinding, babbitting, hand tool and machine work. Your choice of 50 mm. Super Armorplate or 6 Curve Super Armorplate clear or Calobar lenses in three shades. Ask your nearest AO Safety Representative.

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THIS LITTLE BOOK MAY SAVE YOU BIG PRODUCTION MONEY!

- Tells how you can save from 10¢ to 20¢ a pound on high speed steels and get better results!
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...TRADE PUBLICATIONS...

MELTING POTS: American Car & Foundry Co., 30 Church St., New York 8—Catalog lists the features of the company's cast iron melting pots for aluminum and lead, including tables of sizes, weights and capacities for stationary or holding pots, tilting pots with pouring spout, bottom drain off pots and special shaped pots.

LATHE OPERATION: South Bend Lathe Works, 299 East Madison St., South Bend 22, Ind.—Revised edition of "How To Run a Lathe" contains information on the operation and care of metal working lathes. Book contains 128 pages and over 365 illustrations. It is available with paper cover for 25 cents or with leatherette cover for $1.

ALUMINUM ALLOY: Federated Metals Division, American Smelting & Refining Co., 120 Broadway, New York 5, Dept. SJ—Folder describes aluminum casting alloy which is said to produce castings with heat treated properties without the expense of heat treatment. Graphs of the metal's properties and tables of technical data are included.

PLATFORM SCALE: Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia 24—Bulletin P714C describes and illustrates new platform scale. Charts give scale dimension, platform sizes, scale capacities, dial graduations, tare beam capacities, beam capacities and shipping weight, for both self-contained and semi-self-contained dormant platform scales.

PRECISION PRODUCTS: Falk Corp., 3001 West Canal St., Milwaukee 8—Bulletin 10,000 describes and illustrates gears, speed reducers, couplings, high speed drives, backstops, marine drives and special gear drives. Available services and facilities including steel casting, machining weldments and engineering also are described.

PUMP: Allis-Chalmers Mfg. Co., 1126 South 70th St., Milwaukee 1—Bulletin 08B6319B describes the company's automatic, self-priming pump equipped with a new type automatic spring valve which is said to provide fast, smooth transition from priming or vacuum pumping to straight centrifugal action.

REFERENCE BOOK: Murex Ltd., Rainham, Essex, England—Booklet entitled "Standard Specifications & Typical Analyses—Metals, Metallic Alloys and Carbides" is suitable as a reference work for users of ferro-alloys and pure metals, metal powders and metallic carbides.

VIBRATORS: Syntron Co., 540 Lexington, Homer City, Pa.—Illustrated catalog describes company's line of vibratory material handling equipment and construction and maintenance tools. Included in the line are electromatic vibrators, vibratory feeders, weighing feeders, hopper level switches, explosion-proof hydraulically operated feeders, vibrators, jolters and feeder machines, and portable electric hammers, drills, grinders and sanders.

MILLS: Severance Tool Industries Inc., 753 Iowa St., Saginaw, Mich.—Bulletin 16-M gives full listing of high speed midget mills, junior mills, lab mills, carbide midget mills, die mills, fin mills, micro mills, ground carbide hand files and ground carbide die machine files. It also contains data on patterns of cut, tooth characteristics and pitches of teeth, and gives information on regrinding service.

FANS: Joy Mfg. Co., Oliver Bldg., Pittsburgh 22—Catalog contains facts and figures on the new series 1000 industrial and commercial adjustable blade fans manufactured in a variety of models, producing volumes up to 100,000 cfm and pressures to 9.6 in. wg. In addition to this series, axial flow fans of the vane-axial type for specialized applications are offered.

GENERATORS: Electric Machinery Mfg. Co., 821 Second Ave. S.E., Minneapolis 14—Vol. 8, No. 3a of the company's publication, "Synchronizers," contains articles on "How To Apply Packaged Generators," "Pre-Engineered Switchgear for Generators," "Protective Generator Construction," and tables for generator and wire selection.

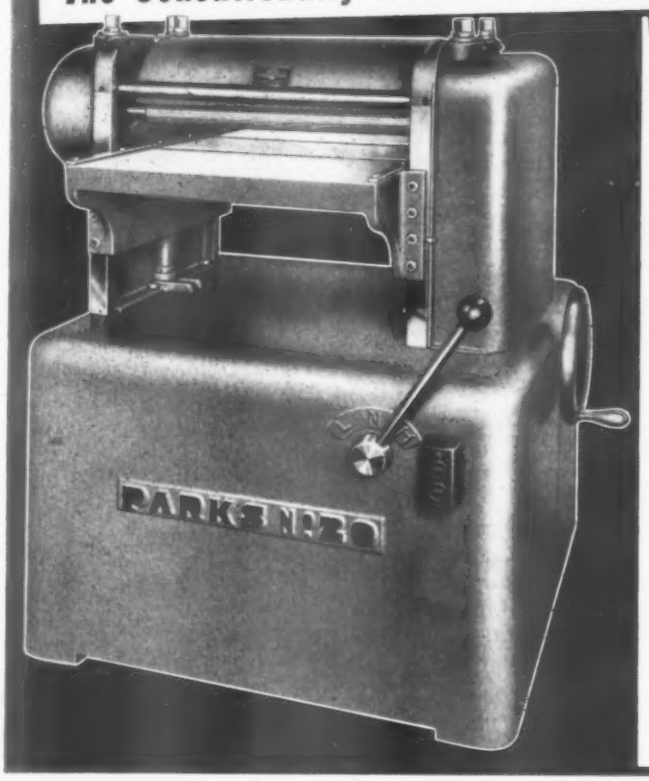
DIECASTING MACHINE: Hydraulic Press Mfg. Co., Mt. Gilead, O.—Bulletin 4805-A gives details and specifications for small capacity diecasting machines—one model a submerged plunger injection machine for lower melting point alloys and the other a cold chamber injection machine for aluminum and magnesium.

VALVES: Sinclair-Collins Valve Co., 454 Morgan Ave., Akron 11, O.—Booklet contains descriptive literature, diagrams, and capacity charts for steam, air, liquid or gas control valves of the direct or reverse acting type, 0 to 250 lb. Valves are manufactured in V-port seats, flat seats and bevel seats.

MALLEABLE IRON: Belle City Malleable Iron Co., 1442 Forest St., Racine, Wis.—Folder 5 contains comparative illustrations of malleable iron castings made by the company in the 1800's and appearing in its catalog issued in 1899, and of malleable iron castings made by the company today.

AIR CYLINDERS: Miller Motor Co., 4027 North Kedzie Ave., Chicago 18—Bulletin A-105 gives various information on air cylinders from 1½ to 14-in. bores. Single and double rod end nonrotating cylinders are shown with or without cushions, and with a choice of standard and many oversize piston rod diameters.

The Sensationally NEW Low-Priced



PARKS No. 20 20" PLANER

Here is a modernly designed, rugged, high-speed, low-priced planer that is ideally suited for every shop and industrial plant requiring a quality surfacer. The Parks No. 20 Planer has a four-knife cutterhead with a speed of 3600 R.P.M. and offers two feed speeds—20 and 40 F.P.M., and 40 and 80 F.P.M. Write for complete descriptive literature.

PROMPT DELIVERY

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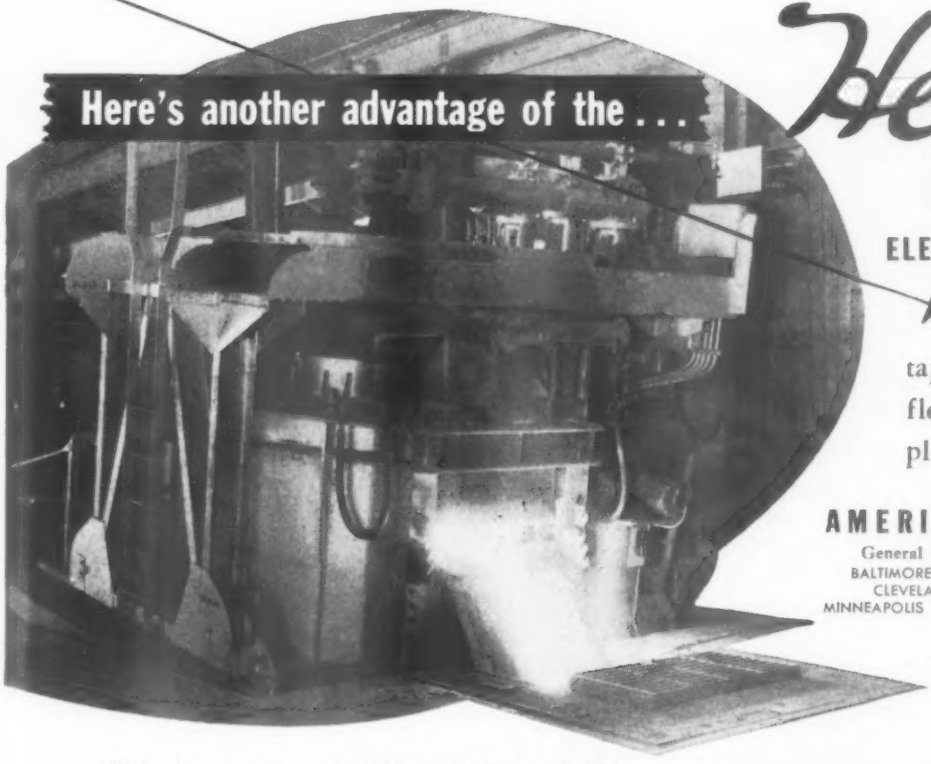
Here's another advantage of the . . .



Heroult GANTRY-TYPE ELECTRIC MELTING FURNACE

Roof moves over tapping pit, eliminating reflected heat, on operating platform.

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There is a
MOLINE SQUEEZER
for **YOUR** *foundry*

NO. 44 HEAVY DUTY PORTABLE

Moline molding machines are doing a big job in foundries all over America and in many foreign countries. Originally designed for use in our own foundries, they feature these advantages: (1) They eliminate the high cost of compressed air. (2) All working parts are above the table, away from the sand. (3) Handle flasks as large cs 16" x 30". (4) Parts are made of steel, malleable iron and semi-steel castings. (5) Aluminum finish makes machines rust resistant. (6) Have half as many working parts as comparable types.

•

THERE MUST BE A REASON!

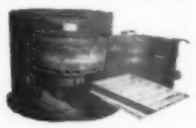
There are four models of Moline Squeezers, designed in accordance with your specific requirements. It will pay you to write for complete details and descriptive folder.

WE SHIP QUICK!

MIW

MOLINE IRON WORKS
MOLINE, ILLINOIS, U. S. A.

CENTRIFUGAL CASTING MACHINES



Model AS

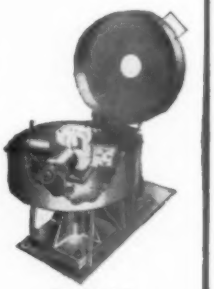
These machines used to make ferrous and non-ferrous centrifugal castings are produced by the pioneer manufacturer of such equipment.

Model J

They are made in a large variety of styles and a wide range of sizes. Complete technical information is supplied concerning sand and permanent mold design, gating, sand mixes, speeds, etc.

Model M

Send us drawings or sketches of parts you are interested in casting centrifugally, and we will tell you, without obligation, if and how our machines can cast them faster, cleaner and with fewer rejects.



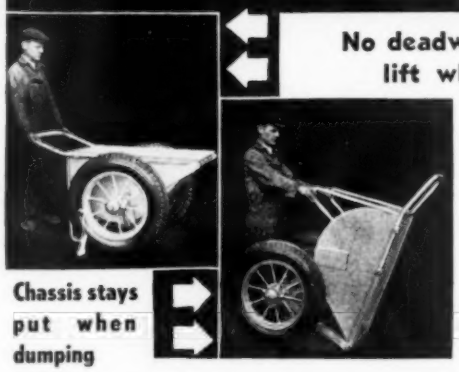
Model J-P

CENTRIFUGAL CASTING MACHINE COMPANY

Nathan Janco, *President*

P. O. Box 947 Tulsa 1, Okla.

New CMC "DUMPOVER" PNEUMATIC TIRED CART



No deadweight to lift when dumping

Chassis stays put when dumping

Just tip as far as required and let contents fall out.

Built in 7 and 10 ft. sizes on pneumatics or interchangeable 30" steel wheels, for easier wheeling and easier dumping of foundry materials.

Write for full information and prices.

CONSTRUCTION MACHINERY CO'S.
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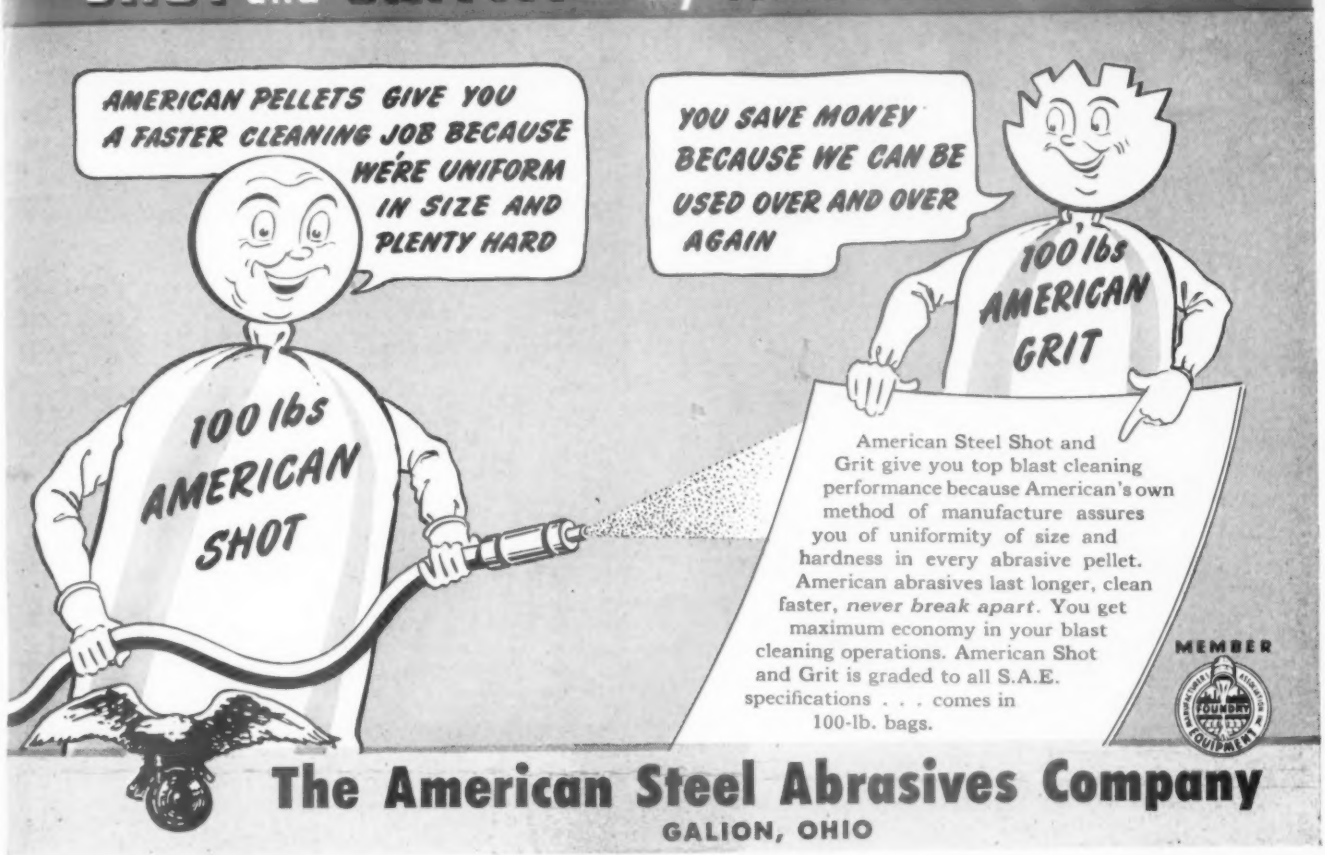
MIXERS • PUMPS • HOISTS
BATCHING & PLACING EQUIP.
SAWS • CARTS • BARROWS

SHOT and GRIT... by AMERICAN STEEL


AMERICAN PELLETS GIVE YOU A FASTER CLEANING JOB BECAUSE WE'RE UNIFORM IN SIZE AND PLENTY HARD
100 lbs AMERICAN SHOT
YOU SAVE MONEY BECAUSE WE CAN BE USED OVER AND OVER AGAIN
100 lbs AMERICAN GRIT

American Steel Shot and Grit give you top blast cleaning performance because American's own method of manufacture assures you of uniformity of size and hardness in every abrasive pellet. American abrasives last longer, clean faster, *never break apart*. You get maximum economy in your blast cleaning operations. American Shot and Grit is graded to all S.A.E. specifications . . . comes in 100-lb. bags.

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The American Steel Abrasives Company

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The Favorite Blades of Non-Ferrous Foundries for Over 20 Years

You will profit by using the tougher Atlantic blades for clean, speedy cutting of gates and risers from castings. You can eliminate unnecessary grinding operations—our specially milled tooth construction makes it easier to cut closer to the body of the casting. All Atlantic Metal Cutting Band Saws are guaranteed as to material, workmanship and temper.

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FOR HEALTH AND COMFORT

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SALT
TABLET
DISPENSER

- Visible tablet line
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- No exposed metal parts
- Dust and moisture resistant
- Streamlined design, attractive green color

Provide your foundry workers with the salt necessary to maintain bodily health and comfort on jobs where profuse perspiration occurs, with Salt Tablets supplied in this sanitary dispenser. Modern in every detail, featuring translucent upper shell which shows tablet line at all times, this streamlined 750-tablet dispenser provides one tablet—*every time*—at each right or left fractional turn of the base. Smooth-finished fracture-resistant plastic, cool green in color, easy to keep clean! A bracket for wall mounting is provided which may be locked securely in place. *Enter your order now.*

M.S.A. Salt Tablets, plain 10 grain sodium chloride or combination sodium chloride (7 grain) and dextrose (3 grain) are supplied in convenient waxed cartons of 500 and 1500 tablets.

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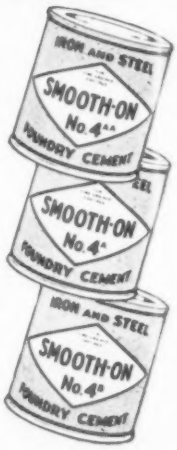
CASTING
Should Wear

When a casting's "complexion" isn't quite perfect, make pock marks, shallow sand holes, blow-holes, etc. practically invisible with Smooth-On No. 4 Foundry Cement. Thousands of foundries today finish their castings this way. Smooth-On expands slightly as it sets, hardens like the casting metal, stays tight, may even be filed. Three shades to choose from.

Match LIGHT GRAY castings with Smooth-On No. 4AA. 1-, 10- and 50-lb. sizes . . . Match MEDIUM GRAY castings with Smooth-On No. 4A. 1-, 5-, 25- and 100-lb sizes . . . Match DARK GRAY castings with Smooth-On No. 4B. 1-, 5-, 25- and 100-lb.

If your supply house hasn't Smooth-On Foundry Cements, write us. If you've never tried them, we'll send you generous FREE SAMPLE to test. Specify shade preferred. We'll send also FREE 40-PAGE REPAIR HANDBOOK full of other valuable repair ideas. Send TODAY.



SMOOTH-ON MFG. CO., Dept. 17-C,
570 Communipaw Ave., Jersey City 4, N. J.

Do it with **SMOOTH-ON**
FOUNDRY CEMENT

ARE YOUR COSTS HAND MADE?

Cut your high labor costs of material handling 50% by eliminating slow hand work with

ROURA SELF-DUMPING HOPPERS

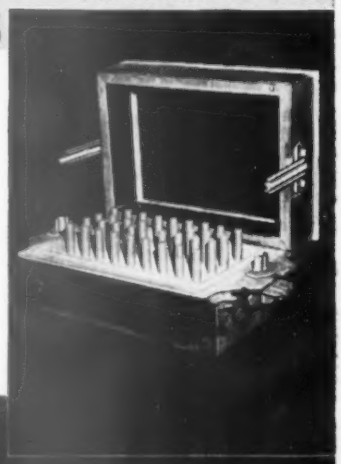
One hopper instead of several. Built for hot, cold, wet or dry materials. Carries safely on any standard fork or platform lift truck. Automatically dumps, rights and locks securely . . . QUICK, STURDY, SAFE & ECONOMICAL. Types and sizes for every job. Write today for detailed bulletin "In Dollars & Sense".

ROURA IRON WORKS, INC. 1405 WOODLAND AVE. DETROIT 11, MICHIGAN

Eliminate Ruined Molds!

GET PERFECT LIFTS WITH BUCKEYE "Three-In-One" Flask Guides

(PATENTED)



Buckeye "Three-In-One" Patented Flask Guides positively prevent the cope from being rocked or shifted while being lifted from the drag!

You get a true perpendicular lift every time because of the *patented* three V-shaped tongues on the pin. The cope, cheek and drag balance perfectly in removing; two finger lugs simplify the raising of the cope from the drag. And the cope returns perfectly straight upon the drag, enabling cores to recede into perfect alignment with the prints!

Pin, slide and match plate lugs are interchangeable, no need to realign if replacement is required.

To retain absolute pattern contour, cut costs and increase production, specify Buckeye "Three-In-One" Patented Flask Guides for all straight or tapered flasks. Furnished in 3, 4, 5, 6, 7 and 8" lengths. Write for full details and prices today!

MANUFACTURED EXCLUSIVELY BY

THE BUCKEYE PRODUCTS COMPANY

7029 VINE STREET, CINCINNATI 16, OHIO

Manufacturers of LINSEAL Core Oil — Parting — Core Compounds — Refractory Cements

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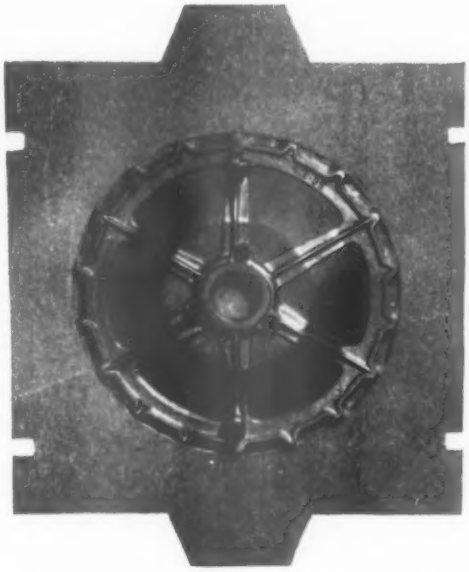


INCREASED PROFITABLE PRODUCTION AT LOWER COST WITH LESS SCRAP IS A POSITIVE AND DIRECT RESULT OBTAINED BY USING OUR PRESSURE CAST ALUMINUM MATCHPLATES, COPE & DRAG PLATES, COREBOXES AND LARGE DRIERS WHICH WE PRODUCE WITHOUT SIZE LIMITATIONS.

ONLY ONE MASTER PATTERN REQUIRED

ALLOW 1/8" PER FOOT FOR OUR SHRINKAGE

We shall be pleased to receive your request for quotations, delivery dates and layout forms. Immediate deliveries available in most cases.

PRESSURE CAST PRODUCTS CORPORATION

1030 VERMONT AVENUE DETROIT 16, MICH. Tel. TAshmoo 5-8188

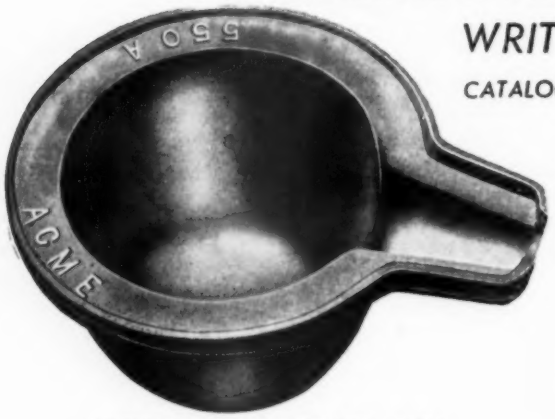
AFFILIATED PLANT LOCATIONS:

Birmingham, Alabama **Coffeyville, Kansas** **Menasha, Wisconsin**

Write us for information and details

MELTING POTS—Ingot Molds

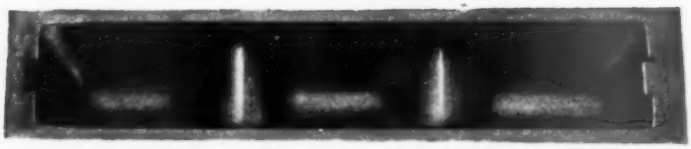
for ALUMINUM AND OTHER NONFERROUS METALS. 45 SIZES.



ROUND SPOUT POT NO. 550A
WITH 1½" COLLAR ON FLANGE

WRITE for
CATALOG "F"

HOLDING BOWL NO. HP7001



INGOT MOLD NO. AA-6

Made of Acme SPECIAL-M-Heat Resisting Iron — They Stand the Heat!

ACME FOUNDRY COMPANY

DETROIT 16, MICHIGAN

2502 TWENTY-SECOND ST. PHONE TASHMOO 5-2404

BLACKEN MOLDS

FASTER AND BETTER
with the
MURPHY PISTOL SPRAYER
ELIMINATES SWAB, BRUSH and SPRAY CAN

BLACKENING REACHES HIDDEN POCKETS
MOLDS ARE BLACKENED FASTER
CASTINGS PEEL BETTER
WORK COMES CLEANER
Satisfactory Performance Guaranteed or Money Back

PRICES COMPLETE WITH SUCTION HOSE AND SINKER

PIPE SIZE	1/16"	1/8"	1/4"	3/8"	1/2"
PRICE F. O. B. HAMILTON, O.	$12.00	$12.00	$12.00	$14.50	$18.00

Used for Silica wash, oil, water or any liquid material. For sand-blast cleaning. As a blow gun for cleaning motors and machinery. If your dealer cannot supply you at once, order direct from manufacturer below. Literature on request.

GUARANTEED COMPRESSED AIR PRODUCTS

AFTERCOOLERS • SEPARATORS • STRAINERS • TRAPS
SPRAY GUNS • PISTOL SPRAYERS

JAS. A. MURPHY & CO.
FIFTH AND VINE STREETS, HAMILTON, OHIO
Moisture Elimination Up To 3000 Pounds Per Square Inch

DOUBLE YOUR PRODUCTION—with the fastest and most powerful Rammer made—

NO. 4 DAYTON RING VALVE BENCH RAMMER

Aside from its efficiency, the chief advantage of this Rammer lies in its long life. The Valve Unit will last for years without repair or replacement. The Cylinder Bore and Piston Rod are HARD CHROME PLATED, features which double the life of the Rammer and reduce maintenance costs at least one-half.

Have been adopted as standard by some of the largest users of Rammers throughout the Country. MADE IN FIVE SIZES. Send for Bulletin No. 300.

DAYTON PNEUMATIC TOOL CO., DAYTON, O.

Magnesium Castings
increase efficiency and cut production costs!

UTICA engineers prove the economy and efficiency of Magnesium Castings in their own plant operations!

The many advantages of Magnesium Castings—increased production and efficiency, reduced costs and weight—are being utilized now by the Utica Radiator Corporation . . . *right in its own plant!* In the core room . . . in the foundry . . . experience is showing the wisdom of using this modern metal for modern production. Let Utica engineers show you how to solve your problems with modern Magnesium Castings!

Facts you'll want to know about Magnesium Castings

Our new folder gives you the facts you'll want to know about Magnesium . . . and the story of our production facilities. You'll want this information at your fingertips!

Write for your copy today!

Utica Radiator Corporation
Manufacturers of Magnesium Castings for Industry
2260 Dwyer Avenue • Utica 2, New York

Schmieg
CENTRI-MERGE

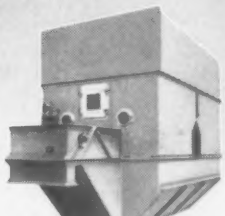
PRODUCTION FINISHING SYSTEMS

SPRAY BOOTHS

FRESH AIR SUPPLY SYSTEMS

OVENS—DRYING and PROCESSING

DESIGNED . . . BUILT . . . INSTALLED to Synchronize with Your Production Line . . .



CENTRI-MERGE Collection Units are available in capacities to handle any air cleaning job—small or large. May be installed singly or in batteries, depending upon volume of air to be handled.

If you are contemplating a new installation, or a rearrangement of your present equipment that involves any of the products listed above, Schmieg engineers can be of valuable assistance. They will gladly make recommendations to meet your production requirements without cost or obligation to you.

THE *best* AIR PURGE is CENTRI-MERGE

Schmieg
INDUSTRIES INC.
Engineers & Manufacturers

302 PIQUETTE AVENUE • DETROIT 2, MICHIGAN

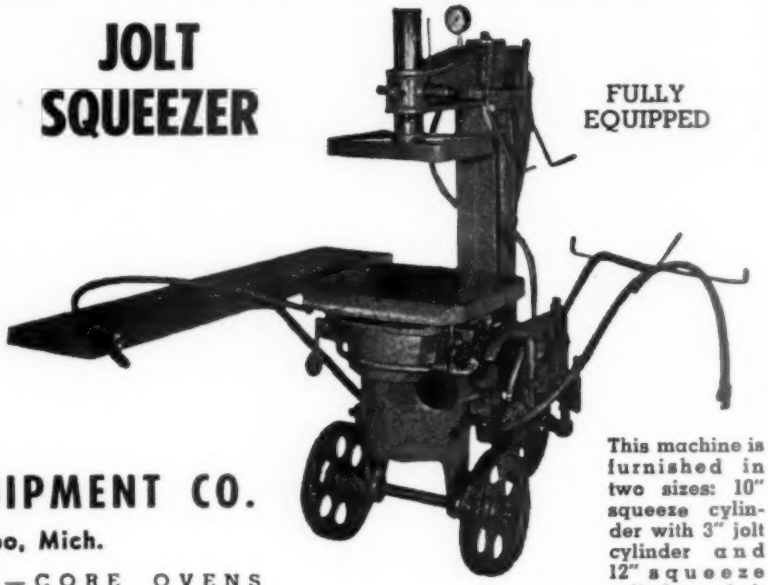
HAYNES EQUIPMENT—

JOLT SQUEEZER

FULLY EQUIPPED

● The post and squeeze cylinder on the HAYNES JOLT SQUEEZER is cast all in one piece. There are no bolts or screws in this machine. The top of the post is machined on top with a 2 7/16" cold rolled shaft which the swing arm swings on.

This is a portable machine with three wheels, two in front, one in back, zerk fittings on all moving parts. Comes equipped with air gauge, pop-off gauge and a pin on top of the arm for a gate horn.



This machine is furnished in two sizes: 10" squeeze cylinder with 3" jolt cylinder and 12" squeeze cylinder with 4" jolt cylinder.

HAYNES FOUNDRY EQUIPMENT CO.

814 Ada Street—Kalamazoo, Mich.

LADLES—BRASS FURNACES—CORE OVENS

BLYSTONE • MIXERS •

THE paddle-type mixer for core sand mixing in the foundry. Blystone Mixers offer: low mix cost, thorough mixing, and easy operation. There is a sturdily built type and size for your problem. Send for Bulletin and full details.

• BLYSTONE DIVISION •
STANDARD SAND & MACHINE CO.
549 W. Washington Boulevard, Chicago, Illinois

IMMEDIATE FUSION WITH MOLTEN METAL PREVENTS LEAKS

Buffalo "*LEEK-PRUF*" CHAPLETS

In both Double (shown) and Single Head types of "Buffalo" *LEEK-PRUF* Chaplets, the chief factor of efficiency is the exclusive fin design.

Integral with the stem, this extremely thin section protrudes to its full width. There is no recess in the stem to cause weakness. The advantages of this original fin design speak for themselves.

- Positive fusion with molten metal—no chance for leakage.
- Burns in more easily.
- Does not chill molten metal.
- Stem is always full size—hence stronger.

CATALOG NO. 14
Complete information, full range of sizes, on double and single head (round or square) chaplets, as well as many other types.
MAILED ON REQUEST

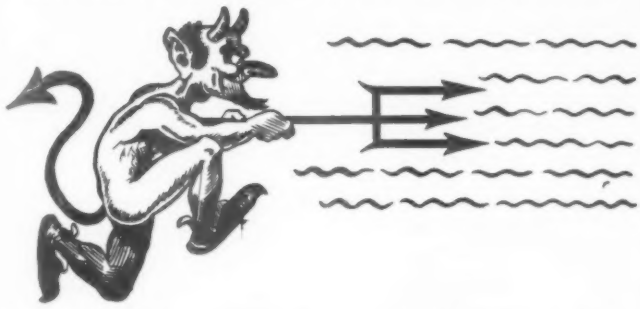
Trial samples of any chaplets furnished without charge.

Combined SUPPLY & EQUIPMENT CO., INC.
211 CHANDLER ST., BUFFALO 7, N. Y.

SOFFEL'S THERMOTOMIC WP

(Patents Pending)

For Ferrous and Non-Ferrous Metals Now Waterproofed — Will Not Absorb Moisture Even in Green Sand Molds



Heads and Risers are Removed Without Cutting

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

SOFFEL'S NEW WATERPROOF THERMOTOMIC COMPOUND is an exothermic insert molding material which produces a temperature of 3500° F. Known as THERMOTOMIC WP, this new waterproofed material is molded and baked into any desired shape in much the same manner as ordinary sand cores. When dry, THERMOTOMIC WP cores are highly resistant to moisture pick-up and may be placed in green sand molds many hours before pouring without absorbing moisture. This is of interest to every foundry where it is routine practice to allow completed molds to stand overnight or longer before pouring.

THERMOTOMIC WP is used as ring inserts under risers or feeding heads where its exothermic action serves to raise the temperature of the feeding metal thus assuring adequate feeding while the casting cools and solidifies. In this manner, pipe and shrink cavities caused by premature freezing of the feeding metal are eliminated. THERMOTOMIC WP readily lends itself to many other applications. It is used as facing inserts or as a facing application in molds where it is desirable to maintain the metal in a liquid state for an extended period of time; in gate cores or strainer cores, and at the juncture of light sections with heavy sections to equalize the rate of solidification of the metal, thus preventing internal strains or shrink cracks. After having burned out, THERMOTOMIC WP retains its original shape and becomes a refractory insulator. Because of reduced riser dimensions and the restricted feeding neck of one or one and one-half inches made possible by the use of THERMOTOMIC WP, tremendous savings are realized through increased yield and reduced cleaning costs.

NOTE: For use in dry sand molds, our Non-waterproofed Standard Thermotomic is recommended as usual. Write for descriptive booklet on SOFFEL'S THERMOTOMIC PROCESS for full particulars.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

SOFFEL'S NO. 5 CARBON FREE LIQUIDIZER

An Exothermic Feeding Head Compound and Pipe Eliminator

In order to obtain the maximum feeding metal in the casting from the risers, it is important that SOFFEL'S NO. 5 CARBON FREE LIQUIDIZER be used in conjunction with THERMOTOMIC WP. NO. 5 CARBON FREE LIQUIDIZER is applied on the surface of the feeding metal in the heads or risers, where it enters into an exothermic reaction which raises the temperature of the feeding metal and prevents loss of heat from the surface. This action of NO. 5 CARBON FREE LIQUIDIZER helps keep the feeding heads open to atmospheric pressure.

Pittsburgh Metals Purifying Co.

"Fluxes and Purifiers for all Metals and Alloys"

1352 Marvista St., N.S. Pittsburgh, (12) Pa.

The preferred abrasives in many blast cleaning departments----

BECAUSE They are made from materials chosen by blast cleaning experts and properly tempered by our exclusive heat treating process. The result is amazing resistance to wear and shattering, faster cleaning and outstanding economy.

BECAUSE They are most accurately graded. When you order any one of our many sizes you are assured of greatest uniformity and highest cleaning efficiency.

IMMEDIATE SHIPMENT. Write for Samples and Price List.

The Cleveland Metal Abrasive Co.

Main Office and Plant:

880 E. 67th Street, CLEVELAND 8, OHIO

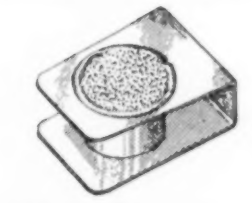
Howell Works: Howell, Mich.

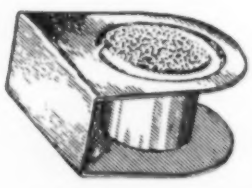
OUR BELT MACHINES are built in lengths 12 to 24 ft. with or without cleats —TROUGH or FLAT. Very efficient for handling slack, pea and nut coal, coke, sand, gravel and other loose material.—We use the best rubber belts obtainable.

WELL AND STRONGLY BUILT—YOUR ORDERS WILL HAVE PROMPT ATTENTION

THE GODFREY CONVEYOR CO., INC.
ELKHART INDIANA

CHAPLETS





HINGE TUBES

Widely used to core holes through ribs and lugs which extend into the mold perpendicular to the parting line, the hinge tube assures clean holes, accurate for size and location. We have pioneered a wide range of types and sizes.

SEND FOR CATALOG NO. 120

Smith & Richardson
MANUFACTURING COMPANY
MANUFACTURERS OF HINGE TUBES, CHAPLETS AND FOUNDRY SPECIALTIES
GENEVA • ILLINOIS

LADLES

for Handling and Pouring

ALL METALS

TIMKEN-WORM GEARED LADLES

These patented ladles are designed by men with over 30 years of practical foundry experience.

They offer the utmost in Safety, Dependability, Long Life, Ease of Operation, Convenience, Economy and Simplicity.

They are manufactured in all types and sizes, and are arranged for manual or electrical operation.

Our line of pouring and handling equipment is complete, including bowls, shanks, bails and tongs . . . special equipment.

INDUSTRIAL EQUIPMENT CO.
115 NORTH OHIO STREET • MINSTER, OHIO

You are invited to TEST the Uniform Quality of DAYTON CORE OIL

• "Your guarantee of uniform quality since 1924."

Prove to your own satisfaction by *actual trial*, what hundreds of foundries have discovered . . . that you get better cores at lower cost by using DAYTON CORE OIL. As a result, you get cleaner, more uniform castings. Our representatives are trained by years of experience to help you solve your core production problems. Order a drum of Dayton Core Oil . . . test it! We believe you'll want to use it exclusively thereafter.

"ASK THE MEN WHO USE IT"

THE DAYTON OIL COMPANY • DAYTON, OHIO

MAKERS OF DOCO BINDER & CORE PASTE • DOCO STEEL CORE & MOLD WASH

Announcing the New- Morrison CORE OVEN

MORE PRODUCTION—with Uniformity . . . Speed
LESS COSTS—mean Fuel Savings...Space Savings

The new MORRISON standard Oven is designed for core-baking, mold-drying, and similar applications requiring maximum uniformity obtained by forced convection of heated air.

The MORRISON method of uniform heating by forced convection is also ideal for curing plastics, baking paint and enamel finishes, and other processing of materials up to 750° F.

PLEASE SEND A MORRISON SPECIALIST TO SEE ME IMMEDIATELY.

FIRM ..... NAME .....

ADDRESS .....

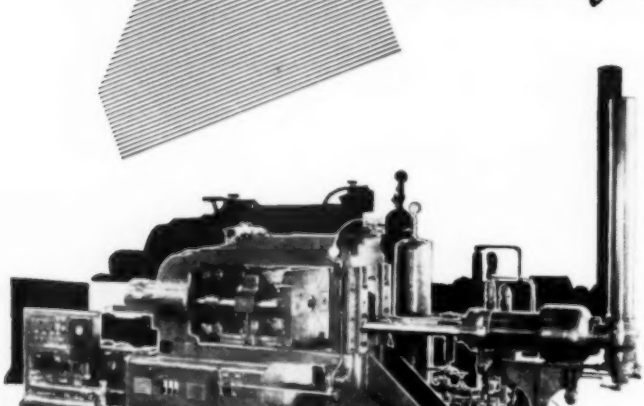
CITY ..... STATE .....

Morrison ENGINEERING CORP.

5005 EUCLID AVE. CLEVELAND 3, OHIO

2nd to none...

But a second machine to more of our customers



More and more of the die casting machines built by Lester-Phoenix are being ordered by customers who already have a Lester in operation. One of the companies to whom a second HHP-3-x-S, with prefill, will soon be shipped, is New Products Corporation of Benton Harbor, Michigan. There, the first Lester has been running successfully for months. The second machine is the *proof* of this superior performance! Whether your needs are for the zinc-lead-tin type of die casting machine, or for the aluminum-magnesium-brass type, you can be sure that a Lester-Phoenix is second to none. Complete specifications will be furnished on request.

LESTER-PHOENIX, INC.
2659 Church Avenue, Cleveland, Ohio

LESTER-PHOENIX
DIE CASTING MACHINES

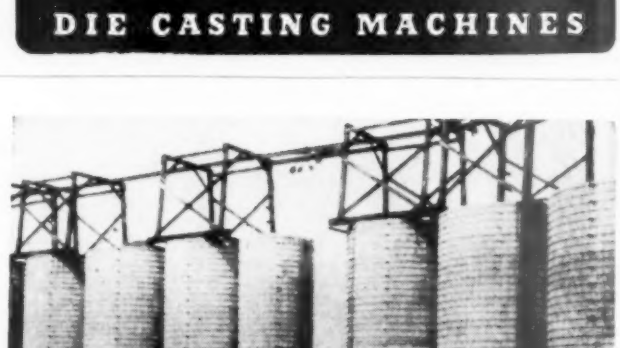
"OLIVER"
38-inch Metal Cutting
BAND SAW

Saws Sprue, Heavy or Light Sections of Metals, Sheet Metals, Compositions or Wood

Available with high or slow speeds for cutting metals at a speed to suit the job. This heavy-duty saw is powerful . . . cuts true and steady. Has quick-change rim and tire, and latest safety devices. "Oliver" Metal Cutting Band Saws also available in 18", 30" and 36" sizes.

Write for Bulletin No. 115-S

OLIVER MACHINERY COMPANY
Grand Rapids 2, Michigan



NEFF & FRY BINS SAVE MATERIAL HANDLING COST

Massey, Wood & West of Richmond, Va., store coal in ten Neff & Fry bins. Coal is hoisted into the bins with conveyors from dump pits, then loaded into delivery trucks by gravity.

Says the foreman, comparing this operation with one not so equipped, "We deliver more coal with half as many trucks."

Similar savings are experienced wherever Neff & Fry storage systems are employed in handling all sorts of flowable bulk materials. And because Neff & Fry super-concrete storage bins last a generation with virtually no maintenance, they pay for themselves again and again through savings.

You should get complete information from us if you're interested in the most satisfactory and most economical storage.

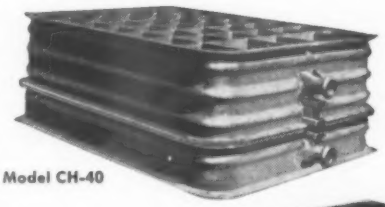
THE NEFF & FRY CO., CAMDEN, OHIO

NEFF & FRY STORAGE BINS

TRUSCON FOUNDRY FLASKS

Foundry-Engineered at every point where good design is important

Model OM-1



Model CH-40

Model TM-10

Truscon manufactures one-man, two-man and power handled flasks available to meet your own particular production requirements.

Correct Thickness of Flask Wall

The walls of every Truscon flask are built with great strength and rigidity to withstand severe strains. The ribs and flanges extend full depth around the entire flask without buckling or cutting away the metal.

Proper Placing of Flanges

The flanges and ribs of Truscon flasks are designed to help the molder. The flange on the filling side is turned out so as not to interfere with filling or shaking out. The flange on the bottom side or parting line is turned in, forming a sand strip to carry the sand.

Types of Handles and Pin Lugs

Truscon flasks have available a range of handles and pin lugs to meet every particular need. They are welded or riveted securely, as may be desired.

Adequate Strength without Excessive Weight

Every Truscon cope, drag and check is one integral piece of steel. There are no built-up sections that jar loose. Truscon flasks withstand the knocks and hard usage they are bound to get.

TRUSCON STEEL COMPANY

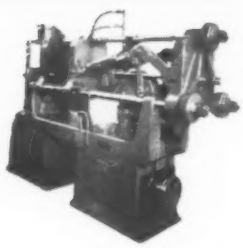
PRESSED STEEL DIVISION

6202 Truscon Ave. • Cleveland 4, O.

Subsidiary of Republic Steel Corp.

Write for catalog showing wide range of Truscon Steel Flasks available.

Fully automatic die casting machine produces 720 shots per hour



Here are examples of more output per manhour *every hour* from fully automatic die casting production. Nut above weighs 1 oz. Gear weighs ¾ oz. Work Horse Model 16AZ, for zinc, tin and lead castings, produces each part in a single cavity die at 720 shots per hour. *Casting cycle is completely automatic.*

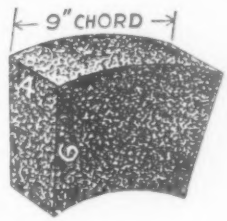
Die movement, shot and ejection occur in continuous, completely automatic cycles. Between-cycle delays are eliminated. There's no human element in determining hourly output. Operator merely fills melting pot occasionally and lubricates die. *At these high speeds, you can use single cavity dies and cut die cost 50 to 90%.*

Multiple cavity dies, however, are often used. Work Horse Model 16AZ has a 30 sq. in. casting area with 16 oz. capacity. There are four speeds: 240, 340, 520, 720 shots per hour. Conduit fittings weighing 0.6 oz. are produced at 240 shots per hour in an 8 cavity die. *That's 1920 fittings every hour from one low-cost machine!*

Increase output and dimensional accuracy . . . reduce floor space needs, die costs and downtime. Write for our folder on Work Horse Model 16AZ *today*.

LIGHT METAL MACHINERY, INC.

736D PENTON BUILDING • CLEVELAND 13, OHIO



6" Cupola Blocks and

6" Rotary Kiln Blocks

Dimensions of all Blocks

Outside Chord . . . . . 9"
Radial Dimensions . . . . . 6"
Thickness . . . . . 4"

Block Number	Inside Chord in Inches	Diameter in Inches		Number of Blocks to Circle
		Inside	Outside	
30-42	6 1/16	30	42	15
36-48	6 3/4	36	48	17
42-54	7	42	54	19
48-60	7 1/16	48	60	21
54-66	7 3/16	54	66	23
60-72	7 1/16	60	72	26
66-78	7 5/16	66	78	28
72-84	7 7/16	72	84	30
78-90	7 1/16	78	90	32
84-96	7 9/16	84	96	34
90-102	7 11/16	90	102	36
96-108	8	96	108	38
102-114	8 1/16	102	114	40
108-120	8 3/16	108	120	42
114-126	8 5/16	114	126	44
120-132	8 7/16	120	132	46
123-135	8 1/16	123	135	48

Cupola blocks standard and super quality. Refractory shapes, milled fire clay and cements.

THE DAVIS FIRE BRICK CO.

OAK HILL, OHIO

EVERYTHING
FOR THE FOUNDRY
... and we *mean*
Everything

COVERING THE HEART OF THE FOUNDRY INDUSTRY OF "THE EAST"

Through more than 25 years of contact and observation in "the heart area," we have come to learn what you want most . . and some of the things wanted occasionally. As a result we have a high batting average when it comes to filling orders for foundry supplies and equipment directed our way because we carry the largest complete warehouse stock of Foundry Supplies in "The East." Try us with your next "sticker."

PENNSYLVANIA FOUNDRY SUPPLY & SAND CO.
ASHLAND AND EAST LEWIS STREETS
PHILADELPHIA 24, PA. Telephone JE 5-1012

A BLAST FURNACE PRODUCT

Smelted from Superior quality lake ores, high grade metallurgical coke and limestone, using our own local No. 1 Sharon Seam coal.

A "blend" with JISCO is sound metallurgy.

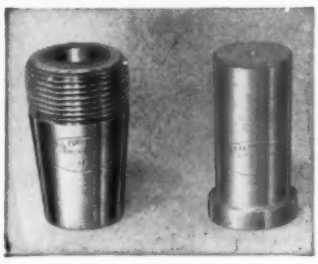
HIGH SILICON IRON
JISCO

THE JACKSON IRON & STEEL *Company*
JACKSON, OHIO

BLAST CLEANING NOZZLES

Saves AIR

Saves SHOT, GRIT SAND



FEDERAL BLAST NOZZLES ARE MADE OF
TUNGSTEN-CARBIDE

"The hardest material known to man." For this reason they outwear ordinary nozzles in use for sand blasting and metal cleaning by the blast method. Air consumption is reduced and the blast is *concentrated* because the hole in the nozzle wears very slowly. This means low cost operation.

TRY ONE AND SEE FOR YOURSELF—Made in all sizes and types: adapters furnished for all types of blast cleaning equipment.

The Federal Foundry Supply *Company*
4600 E 71ST ST CLEVELAND 5, OHIO

IT'S NEW—IT'S SENSATIONAL

AMASTEEL

GENUINE ALLOY STEEL SHOT

LASTS MANY TIMES LONGER

Here at last is peak efficiency in Shot for blast CLEANING and PEENING. AMASTEEL SHOT is far better than ordinary hard iron abrasives because it is TRUE ALLOY STEEL.

Compared to regular blasting materials, AMASTEEL offers an amazing superiority due to its long life and resistance to breakdown and greater CLEANING and PEENING speed. This feature means additional savings on labor, handling, storage, freight costs, and dust disposal.

AMASTEEL is produced under exclusive patents and is available in sizes that meet all CLEANING and PEENING requirements.

Investigate AMASTEEL Shot today. It Lasts Six Times As Long!

PRODUCERS OF
PEENBLAST
CLEANBLAST
ALLOY 99

ALLOY METAL ABRASIVE CO.

311 WEST HURON ST. ANN ARBOR, MICH.

H & A 14 INCH Band Saw

Essential in Every Modern Pattern Shop

This new H & A 14" Band Saw provides greater speed and power for working a variety of materials —wood, plastics, aluminum, brass, copper, etc. Its 20" x 23" table tilts 45 degrees to the right—5 degrees to the left, and its big throat capacity allows a cut to the center of a 24" circle on pieces up to 11½" thick. Sturdy cast iron base provides complete rigidity and prevents creeping. Available for IMMEDIATE DELIVERY.

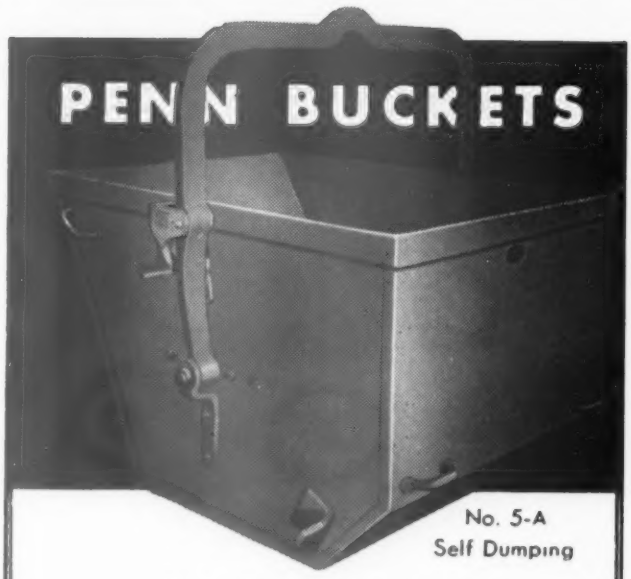
The H & A 6" Jointer, H & A Swing Saw, and H & A Woodmaster are also available. Write for complete information on these H & A Quality Woodworking Tools.

Heston & Anderson

Established in 1921

629 W. Kirkwood St., Fairfield, Ia

PENN BUCKETS



No. 5-A
Self Dumping

Careful balancing makes Penn Buckets self dumping when loaded and self righting when empty. Welded construction prevents "clinging" makes them empty easily and completely.

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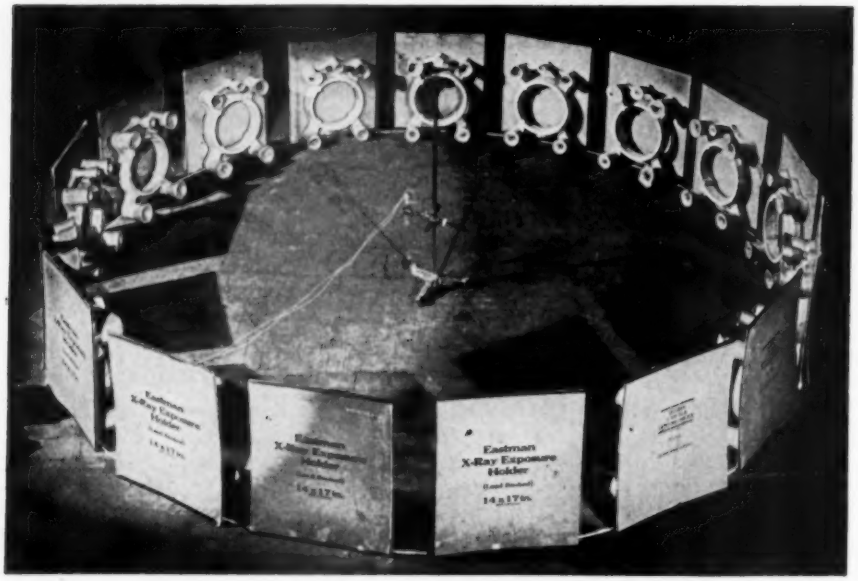
WRITE TODAY FOR NEW BULLETIN DIMENSION SHEET AND PRICE LIST

PENN IRON WORKS

READING, PENNA.

RADIUM RADIOGRAPHY *Performs a* NEW FUNCTION



PHOTOGRAPH COURTESY OF CRANE CO.

"Directional solidification" can easily be studied by the set-up illustrated in the photograph—to indicate the best method of casting with a minimum of defects in the casting itself.

Radium has become a new foundry tool which directly effects an increase in yield. It permits accurate determination of the proper procedure in gating and risering "tough" castings. Seventeen cylindrical castings were radiographed simultaneously by Crane Co. to ascertain the most productive and economical foundry practice.

Radium thus performs a valuable additional function.

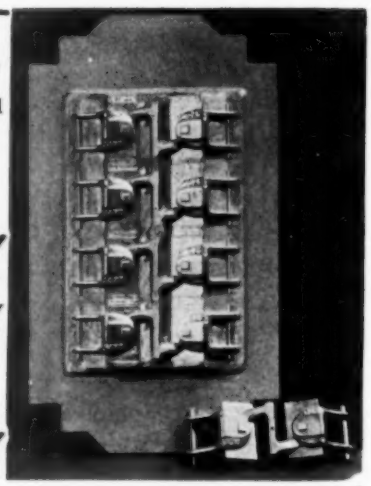
For inspection, for determination of directional solidification, Radium is available in capsules of various unit strength in duralumin holders which may be leased or purchased at low rates.

The rental includes full coverage insurance; heavy load storage containers and slide rule exposure calculators.

Write us concerning any problem of Gamma Ray Radiography

RADIUM CHEMICAL COMPANY, INC. • 570 Lexington Ave., New York (22), N.Y. • Chicago: Marshall Field Annex Bldg.

Matchplate made from single-gated pattern



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Get more output with safety. That means, with greater accuracy. Foundrymen are thus helping their profit by using our pressure-cast matchplates and cope and drag plates. Single or multiple pattern matchplates cast under pressure in plaster molds—that's the proven answer to today's urgent production needs.

Get our quotations today.

PLASTER PROCESS CASTINGS COMPANY
Affiliate of Toledo Matchplate Co.
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Pressure-Cast MATCHPLATES
COPE and DRAG PLATES

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By William A. Rosenberger

This 480-page book, is the answer to industry's demand for dependable, factual data on the subject of impact cleaning, including blast-cleaning and sand-blasting.

Every step in the many processes involved is explained with clear illustrations . . . all especially made for this book. Coupled with the text, they furnish the reader with clear, usable information from which he can plan the correct solution to his own impact cleaning problems.

255 Illustrations
480 Pages
Indexed

PRICE $7.00
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FOR DEPENDABILITY IN FOUNDRY PRODUCTION . . .

The UNITED Steel JACKET

Reinforcement Gusset
EXTRA STRENGTH

Cooling Vent
ELIMINATES WARPING

Sturdy Channel Construction
BUILT TO LAST

United steel jackets are designed and manufactured exclusively for foundrymen who demand a superior product for high production work . . . Unique channel construction assures extra strength and durability . . . New self-cooling double reinforcement at the parting line eliminates warping on runouts . . . All parts are electrically spot welded with additional arc welds at strategic points.

United's engineering service is always available for your more difficult problems.

★ MANUFACTURERS OF CUSTOM SNAP AND SLIP FLASKS ★

United Pattern Works

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DETROIT 28, MICHIGAN

SAVE "DOWN TIME" AND REPAIRS

OPERATE AIR TOOLS WITH
CLEAN DRY AIR

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USE
MURPHY
SEPARATORS

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Employing four positive principles of separation, the Murphy "Type A" Separator carries a money-back guarantee to *deliver* clean, dry air to point of use. Completely automatic separation and ejection. No moving parts to receive wear. No filters to renew. Requires neither attention nor maintenance. Install it . . . and forget it; its *guaranteed*. Write for literature and prices.

GUARANTEED COMPRESSED AIR PRODUCTS

AFTERCOOLERS • SEPARATORS • STRAINERS • TRAPS
SPRAY GUNS • PISTOL SPRAYERS

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FIFTH AND VINE STREETS, HAMILTON, OHIO
Moisture Elimination Up To 3000 Pounds Per Square Inch

Get the contracts. Figure closer. But do it on the preparation end—not on the precision end. You'll find Electro HIGH SPEED GRINDING WHEELS a tremendous help in meeting both price and delivery competition. They're faster, safer, and turn out a cleaner job on any metal whether working from swing frames, floor stands or in portable machines. Learn why. Send today for our Grinding Wheel Manual 645 in full color. It's free.

Service from Los Angeles or Buffalo

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SINCE 1919

K-336

Electro REFRACTORIES & ALLOYS CORPORATION
Mfrs. • Refractories • (High Speed Grinding Wheels) • Crucibles • Alloys
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GRINDERS... ALL KINDS!

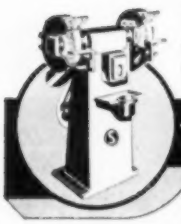
FOR VITRIFIED AND HIGH SPEED WHEELS.

SINGLE OR MULTIPLE SPEED.

MOTOR DRIVEN — BALL BEARING

The No. 30 Grinder, made in sizes of 5 H.P. for 18" wheels up to 15 H.P. for 30" wheels. Larger motors to order. The distance between wheels is 55" or 59".

- Boiler Plate Steel Guards, adjustable to wheel wear
- Multiple V-belt Drive.
- Ball Bearing Motors.
- Speed Control on Multiple Speed Grinders.



Write for our Complete Catalog No. 43 which describes "GRINDERS—all kinds!", from ¼ H.P. to 50 H.P. Also a complete line of Disc Grinders. Long Distance phone Wabash 1677.

The STANDARD ELECTRICAL TOOL Co.
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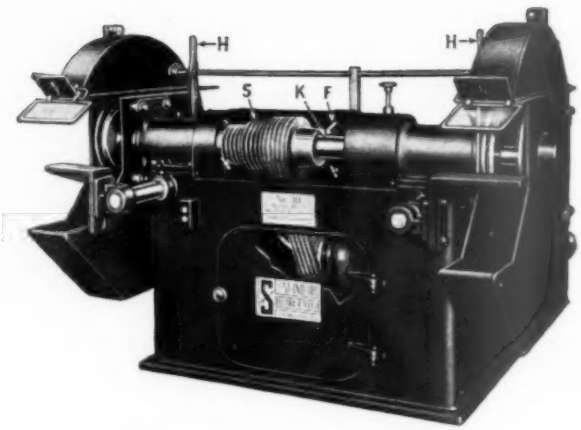
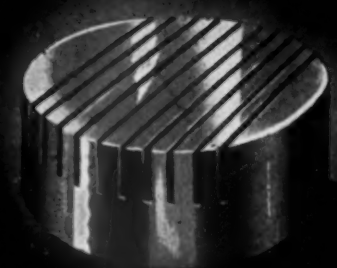
2507 RIVER ROAD



No. 30 (30" 15 H.P. Illustrated)

STANDARDIZE WITH STANDARD

Precision



CORE BOX VENTS

Here's part of a complete line of DEMMLER core box vents—rigidly constructed in varying sizes of slotted brass—slotted steel—and screen mesh. Orders filled promptly from stock!

BRASS SLOTTED CORE BOX VENTS

Slot widths: .010", .013", .015"
Diameters: ⅛", 3/16", ¼", 5/16", ⅜", 7/16", ½", ⅝", ¾", ⅞", 1", 1¼", 1½"

STEEL SLOTTED CORE BOX VENTS

Slot widths: .010", .013", .015"
Diameters: ⅛", 3/16", ¼", 5/16", ⅜", 7/16", ½", ⅝", ¾", ⅞", 1", 1¼", 1½"

SCREEN TYPE CORE BOX VENTS

Mesh: #30, #40, #50.
Diameters: ⅛", 3/16", ¼", 5/16", ⅜", 7/16", ½", ⅝", ¾", ⅞", 1", 1¼", 1½"

SPECIFICATION CIRCULAR ON REQUEST

Wm. DEMMLER & Bros.
Kewanee, Illinois

CLASSIFIED ADS IN

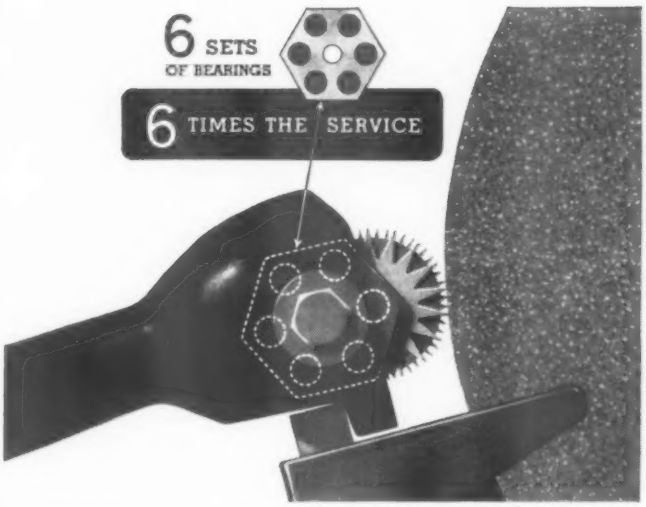
THE FOUNDRY

BRING RESULTS!

- Do you need a superintendent, foreman, metallurgist, electric furnace man, core room foreman, pattern maker, cupola expert?
- Have you some used equipment which should be turned into cash?
- Are you seeking a job?

Address:

CLASSIFIED ADVERTISING SERVICE
THE FOUNDRY
PENTON BUILDING, CLEVELAND, O.



DESMOND HEX DRESSERS, with six-hole bearing blocks, are the most durable mechanical dressers made. As one set of bearing holes becomes worn, turn blocks to new set. Made in five sizes using corresponding Huntington cutters. Desmond —the only complete line—assures you of better grinding wheel performance. Write for catalog and name of your Desmond Distributor. **The Desmond-Stephan Mfg. Co.—Urbana, Ohio**

Desmond

the only complete line of grinding wheel

DRESSERS & CUTTERS

BALL BEARING DRESSERS | REVOLVING CUTTER TYPE DRESSERS | DIAMOND HAND TOOLS AND NIBS | WHEEL TYPE DRESSERS | SIMPLEX STEEL-SLIDE VISE?

CORE SAND COLORS FOR IDENTIFICATION

Some of the larger foundries have found it practical to color their various grades of core sands. This eliminates guesswork and assures the proper use of the required type of core sand for the particular job at hand.

Our laboratories have developed a line of special dyes in a range of colors that have been carefully tested and found suitable as well as economical. Write us for details and samples.

EATON CHEMICAL AND DYESTUFF COMPANY

1490 Franklin Street **Detroit 7, Michigan**

Canadian Plants: Windsor and Toronto

WATERLOX FOR FOUNDRY Maintenance and Production

There is a Waterlox Product for every Foundry need. Costs of upkeep and production can be lowered with the use of the WATERLOX LINE.

WATERLOX
CASTING SEALER AND IMPREGNATOR

Eliminates casting rejects and saves labor, material, and production expense.

WATERLOX
CEMENT FLOOR STAIN

A durable, colorful, coating for cement floors and surfaces.

WATERLOX
HADES ALUMINUM

Its resistance to heat makes it a peerless coating for ovens & furnaces.

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IT WILL PAY YOU TO INVESTIGATE WATERLOX

Write the manufacturer for help with technical problems.

WATERLOX

DIVISION OF
THE EMPIRE VARNISH COMPANY

2636 East 76th St. **Cleveland 4, Ohio**

3 REASONS WHY CERTIFIED ABRASIVES GIVE YOU BETTER BLAST-CLEANING RESULTS

More Economical — Each Grain Solid Homogeneous Mass

Certified Steel Samson Shot and Angular Grit differ from other abrasives because each grain is a solid homogeneous mass *devoid of cleavage lines*. Certified Abrasives *wear away slowly*, retain their original tough cutting and cleaning qualities for maximum blasting efficiency at lowest cost.

Extra Tough — For Faster Cleaning and Longer Wear

Certified Abrasives clean faster and better because they're uniform in size and *extra tough*, developed by a special automatically-controlled hardening process. They wear longer because they *never break apart*.

Safer — No Abrasive Dust Hampers Your Production

Certified Shot and Grit never give off production-hampering dust —they're *safe* for all types of cleaning. Easy to clean and use over again. One 100-lb. bag does the work of two tons of sand. All sizes graded to new S.A.E. specifications.

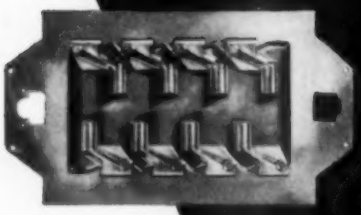
SPECIFY "CERTIFIED" FROM

PITTSBURGH CRUSHED STEEL CO.
PITTSBURGH, PENNA.
STEEL SHOT AND GRIT CO.
BOSTON, MASS.

Hi Accuracy
ALUMINUM MATCHPLATES

Get casting accuracy and stepped up production with Acme matchplates, core boxes, cope and drag plates. Single or multiple sections from one master pattern. Precision cast. Low clean-up time. Prompt delivery. "Quotations Furnished."

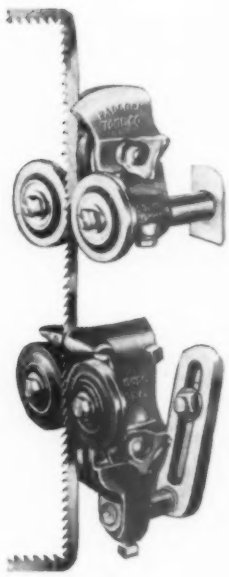
Our 17th year as matchplate and core box specialists. Modern aluminum, brass, and bronze foundry. For a combination of accuracy, economy, and service, send specifications and prints to Acme.



★ MATCHPLATES
★ CORE BOXES
★ COPE AND DRAG PLATES
★ PRECISION CASTINGS

ACME ALUMINUM ALLOYS INC.
DAYTON 3, OHIO

SPEED-UP PRODUCTION
on old or new
Band-Saw Equipment
PADDOCK BALL-BEARING GUIDES



hold the working portion of the blade as if it were in a frame, free from friction. Inter-changeable wheels running with the blade give strong, smooth, fast support.

You save blades—you can cut more materials— PADDOCK GUIDES give perfect operation under all conditions. Sold on ten day FREE TRIAL. Write for circular and price.

PADDOCK TOOL COMPANY
Guide Makers Since 1920
1418 Walnut Street Kansas City 6, Missouri

Paddock
BALL-BEARING
BAND SAW GUIDES

The Trademark of Quality Products

Since 1915

FOUR BOLT SIDE MOUNTING VIBRATOR

HOSE CLAMP

TWO BOLT SIDE MOUNTING VIBRATOR

SINGLE ATTACHING HEAD VIBRATOR

1915
BRANFORD
VIBRATORS
USA

HAND VALVE

RENEWABLE NOZZLE CLEANER & SPRAYER

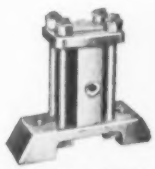
CLEANER & SPRAYER

HOSE NIPPLE

STARTING VALVE

HOSE ELBOW

BOLTED DOUBLE ATTACHING HEAD VIBRATOR


END MOUNTING VIBRATOR

FLASK RAPPER

BLOW GUN 450

NEW HAVEN VIBRATOR CO.
128 CHESTNUT STREET, NEW HAVEN 7, CONN.

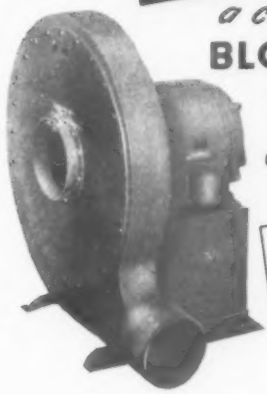
Quantity
PRODUCTION
of
GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866
THE WHELAND COMPANY
FOUNDRY DIVISION

MAIN OFFICE AND MANUFACTURING PLANTS
CHATTANOOGA 2, TENNESSEE

Now "GENERAL" *Offers*
a complete Line of
BLOWERS, FANS, EXHAUSTERS, and BOOSTERS



To Step Up Production and cut Down Costs

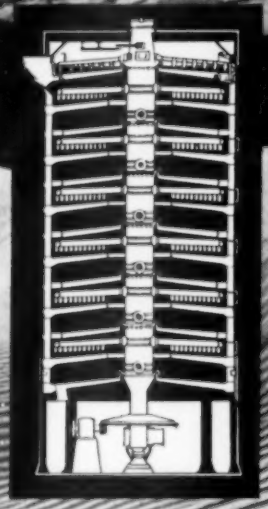
We are now able to give prompt delivery on all types and sizes of air moving equipment. Whether your problem concerns Blowing, Heating, Cooling, Conveying, Aerating, Separating or Agitating—the "LUNGS FOR INDUSTRY" line is complete. Tell us what your problem is and our engineers will fit your needs with a "standard" or "custom built" unit to give you the maximum of efficient operation. Our new, illustrated Product Bulletin "LUNGS FOR INDUSTRY" is now ready for engineers and production executives. For your copy, write:

GB
"LUNGS FOR INDUSTRY"

GENERAL BLOWER CO.
8603 Ferris Ave. Morton Grove 7, Ill.
ENGINEERING OFFICES IN ALL PRINCIPAL CITIES

N E R C O

Sand Reclaiming Units



For the reclaiming of foundry core and molding sand. Complete wet and dry systems for conveying, scrubbing, classifying, thermal processing, cooling and dust collecting. Conserve space, require little attention, and provide close control of time and temperature for the continuous production of "as good as new" sand.

A most profitable investment where medium or large quantities of foundry core sand are used. Available in sizes to handle any required tonnage. Your inquiries are solicited.

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University Tower Bldg., Montreal, Canada

BESSEMER FERRO-SILICONS
GLOBE IRON COMPANY
THE PIONEERS OF SILVERY IRON
SPECIAL HIGH SILICON GRADES
YOU CAN'T THINK OF SILVERY IRON WITHOUT THINKING of GLOBE
GLOBE IRON CO JACKSON, O.

HIGH CALCIUM FLUXING LIMESTONE
for use in
Gray Iron Cupolas
and
Electric Furnaces
Quarry and plant at Hillsville, Pa.
and Lowellville, Ohio
THE CARBON LIMESTONE COMPANY
Established 1848
Youngstown, Ohio

WILLIAMS *Buckets*

"HOOK-ON"
SINGLE LINE
Special Type for
FOUNDRY SERVICE
3/8 to 2 cu. yd. cap.
Send for descriptive bulletin.
THE WELLMAN ENGINEERING CO.
7019 Central Ave. Cleveland, Ohio
built by WELLMAN

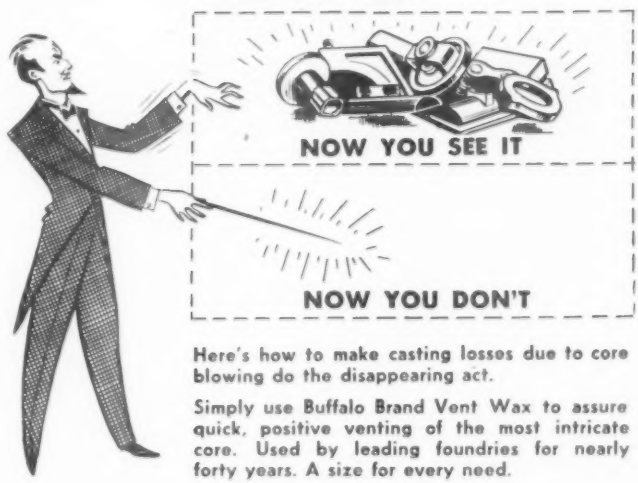
★ Sharper Castings
★ Greater Brinell Hardness
★ Increase Tensile Strength
★ Increase Transverse Strength
★ Increase Wear Resistance
★ Increase Heat Resistance

Copper Shot

IMPROVES YOUR IRON

ALTER COMPANY Fifty Years of Service
1702 Rockingham Road, Davenport, Iowa

THE STORY...
OF THE DISAPPEARING SCRAP PILE



Here's how to make casting losses due to core blowing do the disappearing act.

Simply use Buffalo Brand Vent Wax to assure quick, positive venting of the most intricate core. Used by leading foundries for nearly forty years. A size for every need.

Write for generous free sample.

Buffalo Brand VENT WAX
UNITED COMPOUND COMPANY
328 South Park Ave., Buffalo 4, N.Y.

with
VINCENT-HUNTINGTON
DRESSERS and CUTTERS

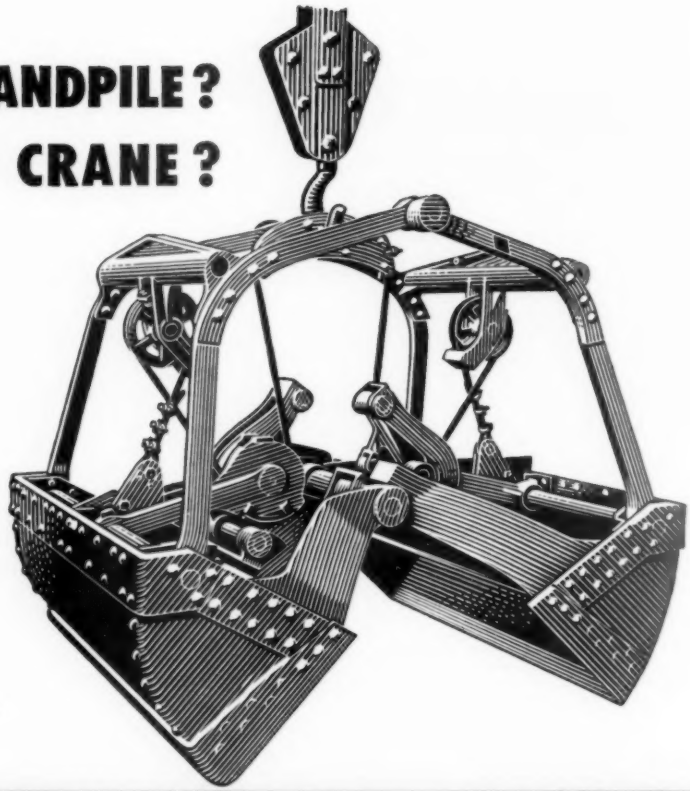
Grinding Wheels are hand dressed fastest with revolving cutter type dressers. And Vincent Dressers add to this saving in dressing time, a bonus of many added dressings per cutter.

Made of special alloy steel—heat-treated to exact hardness by an exclusive process, Vincent Cutters give quality dressings and longer service life. Broken or mushed over teeth are eliminated, even on the toughest jobs.

Vincent Dressers and Cutters are made in styles and sizes to meet your every hand dressing need . . . your mill supply house carries a complete stock.

VINCENT
STEEL PROCESS COMPANY
Heat Treaters of Metals—300 Tons Capacity Daily
Producers of GRINDING WHEEL DRESSERS AND CUTTERS • HSS TOOL BITS
CONICAL CUTTERS AND HOLDERS • DIAMOND DRESSING TOOLS
TUBE CLEANER CUTTERS • HIGHWAY SURFACER CUTTERS
2424 Bellevue Avenue Detroit 7, Michigan

HOW HIGH IS YOUR SANDPILE?
HOW LOW IS YOUR CRANE?



Here's a Blaw-Knox Single Line, Hook-On Type Bucket that needs only 6' 7" operating headroom! Perhaps one of the 4 sizes of this design will prove exactly what you need for efficient handling of moulders' sand, coke, slack coal or other loose bulk materials. You'll find it fully described in Catalog 2002, which will be forwarded immediately on request.

BLAW-KNOX DIVISION
OF BLAW-KNOX COMPANY
2097 FARMERS BANK BUILDING
PITTSBURGH 22, PA.

BLAW-KNOX FOUNDRY BUCKETS

Foundries Save AIR and TIME with Air-O-chek AIR GUNS

No Leaks No Levers No Packing

Nothing to get out of order. Years of troublefree performance without attention. That's why leading plants have bought thousands of AIR-O-CHEKS. Install a dozen and compare results with the best you have ever had. Remember AIR-O-CHEKS have the name stamped in the head. Only AIR-O-CHEKS have the ball and socket connecting the enclosed lever to the valve. Sizes for all requirements. Prompt shipment on high priority.

Precision made of bar brass and stainless steel.

AIR-WAY PUMP & EQUIP. CO., 1058 N. Kilbourn Ave., Chicago 51 Ill.

AMERICAN BRITISH CHEMICAL SUPPLIES, Inc.
180 MADISON AVE. NEW YORK 16, N. Y.
Invites you to write for your free copies of A.B.C. Suggestion Sheets for Melting Aluminum, Brass, Bronze & Grey Iron Alloys
A.B.C. FOUNDRATES, FLUXES & COATINGS
(TRADE MARK REG.)
FOR THE MELTING & CASTING INDUSTRY

CHEMISTS and METALLURGISTS
Grey Iron Foundry Consultants
Complete Foundry Testing
Established over 25 years
A. H. PUTNAM COMPANY
Rock Island, Illinois

To the Foundryman

LABORATORY ANALYSIS REPORT
JOHN DOE FOUNDRY CO. FOR NOV. 22, 1947

SILICON	1.92
SULPHUR	.090
PHOSPHORUS	.170
MANGANESE	.76
GRAPHITIC C	2.54
TOTAL CARBON	3.30
CHROMIUM	.48
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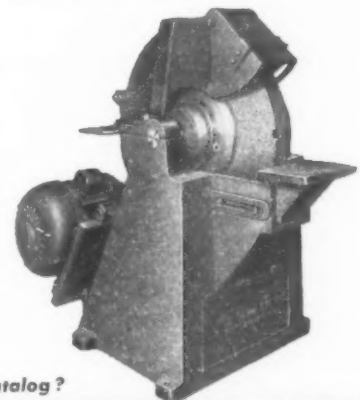

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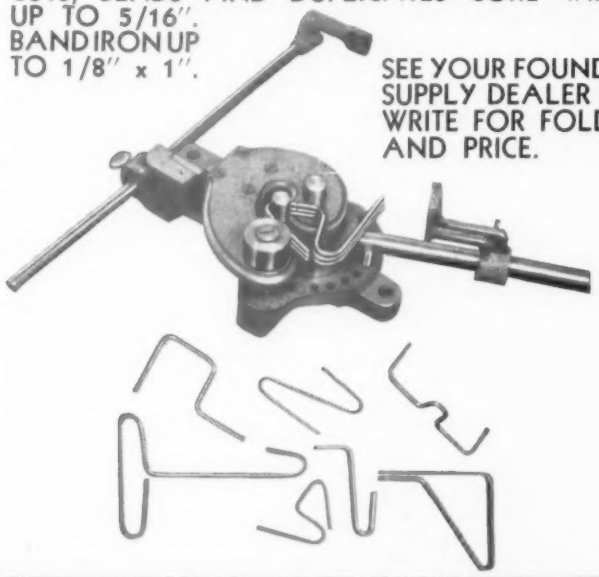

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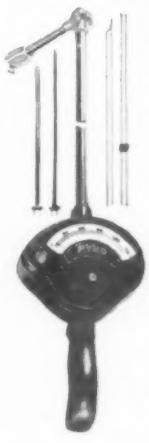

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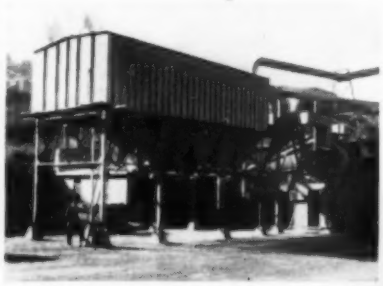

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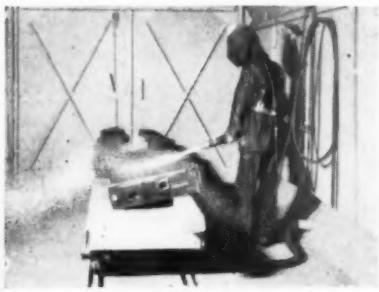

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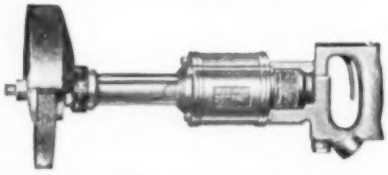

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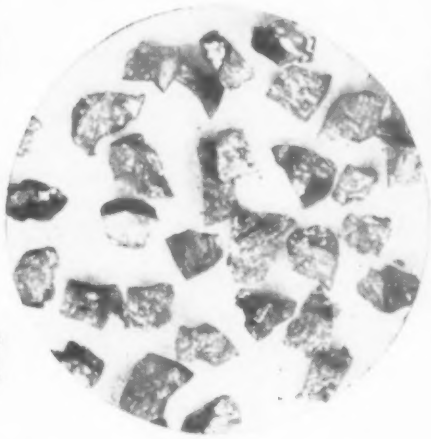

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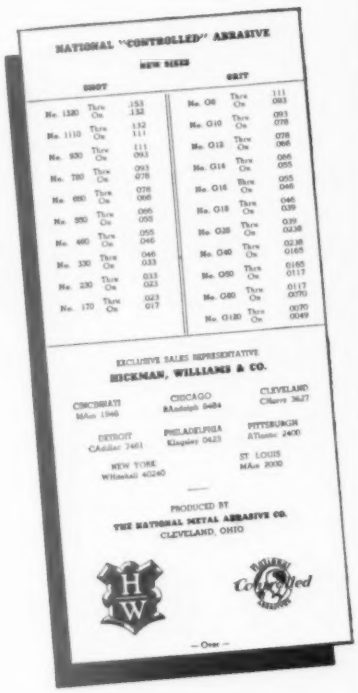

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Industrial Equipment Co., Minster, Ohio.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

BOXES (Tote)

Penn Iron Works, Reading, Pa.
Shanafelt Mfg. Co., 3623 Winfield Way, N. E., Canton 5, Ohio.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.
Truscon Steel Co., Pressed Steel Div., 6100 Truscon Ave., Cleveland, Ohio.

BRAKES (Magnetic)

Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

BRICK (Refractory)

Carborundum Co., Perth Amboy, N. J.
Ironton Fire Brick Co., Ironton, O.
Norton Co., Worcester 6, Mass.
Robinson Clay Products Co., 1100 Second National Bldg., Akron, Ohio.

BRIQUETS (Alloy)

Climax Molybdenum Co., 500 Fifth Ave., New York 18, N. Y.
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.

BRIQUETS (Ferro Alloy)

Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.

BRIQUETS (Silicon Carbide)

Carborundum Co., Perth Amboy, N. J.

BRIQUETTING MACHINERY (Metal)

Milwaukee Foundry Equipment Co., 3328 Pierce St., Milwaukee 4, Wis.

BRUSHES

Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

BUCKETS (Elevating, Clam Shell, Drag Line, Grab, Loader, Dumping)

Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh, Pa.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, O.
Erie Steel Construction Co., Erie, Pa.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Penn Iron Works, Reading, Pa.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

BUILDING and ENGINEERING SERVICE

American Bridge Co., Pittsburgh 19, Pa.

BURNERS (Acetylene, Oil, Gas, Powdered Coal, Stoker)

Eclipse Fuel Engrg. Co., 711 So. Main St., Rockford, Ill.
Fisher Furnace Co., 2453 West Hubbard St., Chicago 12, Ill.
Hauck Mfg. Co., 106 Tenth St., Brooklyn 15, N. Y.
Johnston Mfg. Co., Minneapolis 13, Minn.
North American Mfg. Co., 4455 E. 71st St., Cleveland 4, O.

BUSHINGS (Flask-Pin)

Hines Flask Co., 1324 Hird Ave., Cleveland 7, O.
Shanafelt Mfg. Co., 3623 Winfield Way, N. E., Canton 5, Ohio.
Smillie & Co., C. M., 1100 Woodward Hgts. Blvd., Ferndale, Mich.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.
Universal Engineering Co., Frankenmuth, Mich.

CALCIUM BORIDE

Molybdenum Corporation of America, Pittsburgh 19, Pa.

CALCIUM MOLYBDATE

Climax Molybdenum Co., 500 Fifth Ave., New York 18, N. Y.
Molybdenum Corporation of America, Pittsburgh 19, Pa.

CARS (Core Oven)

Foundry Equipment Co., 1831 Columbus Rd., Columbus 13, Ohio.

CARS (Mold Drying)

Foundry Equipment Co., 1831 Columbus Rd., Columbus 13, Ohio.

CASTINGS

Acme Aluminum Alloys Inc., 232 North Findlay St., Dayton 3, Ohio.
City Pattern Foundry & Machine Co., 1165 Harper Ave., Detroit 11, Mich.
Wadsworth Equipment Co., Akron, Ohio.
Wheland Co., Chattanooga, Tenn.

CASTING MACHINES (Centrifugal)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Centrifugal Casting Mach. Co., Tulsa, Okla.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.

CASTING MACHINES (Permanent Mold)

Master Pattern Co., 1315 Main Ave., Cleveland, Ohio.

CASTING PLASTER

United States Gypsum Co., 300 W. Adams St., Chicago, Ill.

CASTINGS (Permanent Mold)

Alumicast Corp., 1515 No. Kilpatrick, Chicago 51, Ill.
Master Pattern Co., 1315 Main Ave., Cleveland, Ohio.

CEMENT (Metallic)

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Frederic B. Stevens, Inc., Detroit 16, Mich.
Smooth-On Manufacturing Co., 570 Communipaw Ave., Jersey City 4, N. J.

CEMENT (Refractory)

Bay State Abrasive Products Co., Westboro, Mass.
Carborundum Co., Perth Amboy, N. J.
Fisher Furnace Co., 2453 West Hubbard St., Chicago 12, Ill.

CEMENT (Refractory) (Cont'd.)

Ironton Fire Brick Co., Ironton, O.
Norton Co., Worcester 6, Mass.
Robinson Clay Products Co., 1100 Second National Bldg., Akron, Ohio.

CEREAL BINDERS

Chas. A. Krause Milling Co., S. 43rd & Burnham Sts., Milwaukee, Wis.

CHAIN (Hoist, Conveyor, Drive, Sling, etc.)

Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus, O.
Joy Mfg. Co., Joy Division, Pittsburgh, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Taylor Chain Co., S. G., Hammond, Ind.

CHAIN (Steel Loading)

Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
S. G. Taylor Chain Co., Hammond, Ind.

CHAIN (Welded and Weldless)

Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
S. G. Taylor Chain Co., Hammond, Ind.

CHAPLETS

Angell Nail & Chaplet Co., 4580 E. 71st St., Cleveland, Ohio.
Cleveland Chaplet & Mfg. Co., 1197 W. 67th St., Cleveland 2, O.
Combined Supply & Equipment Co., Inc., 215 Chandler St., Buffalo 7, N. Y.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Freeman Supply Co., 1152 E. Broadway, Toledo 5, O.
Milwaukee Chaplet & Mfg. Co., 1023 S. 40th St., Milwaukee 4, Wis.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia 24, Pa.
Shanafelt Mfg. Co., 3623 Winfield Way, N. E., Canton 5, Ohio.
Smith & Richardson Mfg. Co., Geneva, Ill.
Frederic B. Stevens, Inc., Detroit 16, Mich.

CHEMICALS

American-British Chemical Supplies Inc., 180 Madison Ave., New York 2, N. Y.
Hercules Powder Co., Wilmington 99, Del.
Mathieson Alkali Works, Inc., 60 E. 42nd St., New York 17, N. Y.

CHEMISTS

Crobaugh Co., Frank L., Blackstone Bldg., Cleveland, Ohio.
A. H. Putnam Co., 1319 2nd Ave., Rock Island, Ill.

CHILLS

Alloy Metal Abrasive Co., 311 W. Huron St., Ann Arbor, Mich.
Angell Nail & Chaplet Co., 4580 E. 71st St., Cleveland, Ohio.
Milwaukee Chaplet & Mfg. Co., 1023 So. 40th St., Milwaukee 4, Wis.
Smith & Richardson Mfg. Co., Geneva, Ill.
Standard Horse Nail Corp., New Brighton, Pa.

CHILL COATINGS

Acheson Colloids Corp., Port Huron, Mich.

CHILL NAILS

Angell Nail & Chaplet Co., 4580 E. 71st St., Cleveland, Ohio.
Standard Horse Nail Corp., New Brighton, Pa.

CHIPPERS—See PNEUMATIC TOOLS

CHISELS (Chipping)

Bedford Tool & Forge Co., 22 Interstate St., Bedford, Ohio.
Dallett Co., 165 West Clearfield, Philadelphia, Pa.
Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.

CHROMIUM (Briquets)

Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.

CLAMPS (Flask)

Diamond Clamp & Flask Co., Richmond, Ind.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
Shanafelt Mfg. Co., 3623 Winfield Way, N. E., Canton 5, Ohio.
Sterling Wheelbarrow Co., 1700 W. Walker St., Milwaukee 14, Wis.
Truscon Steel Co., Pressed Steel Div., 6100 Truscon Ave., Cleveland, Ohio.

CLAMPS (Permanent Mold)

Master Pattern Co., 1315 Main Ave., Cleveland, Ohio.

CLAY (Bonding)

American Colloid Co., 363 W. Superior St., Chicago 10, Ill.
Carpenter Brothers, Inc., 606 West Wisconsin 3, Mo.
Baroid Sales Division, 830 Ducommun St., Los Angeles 12, Calif.
Eastern Clay Products, Inc., Jackson, O.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Illinois Clay Products Co., Joliet, Ill.
Ironton Fire Brick Co., Ironton, O.

CLAY (Refractory)

Carpenter Brothers, Inc., 606 West Wisconsin 3, Mo.
Eastern Clay Products Inc., Jackson, O.
Illinois Clay Products Co., Joliet, Ill.

CLAY STORAGE BINS

Neff & Fry, Camden, O.

CLEANING EQUIPMENT (Castings)

American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Ill.
N. Ransohoff Inc., 208 W. 71st St., Cincinnati 16, O.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

CLUTCHES (Magnetic)

Stearns Magnetic Mfg. Co., 622 S. 28th St., Milwaukee 4, Wis.
Dings Magnetic Separator Co., 4740 W. McGeough, Milwaukee 7, Wis.

COAL (Anthracite)

Hudson Coal Co., Scranton, Pa

COAL STORAGE BINS

Neff & Fry, Camden, O.

COKE (Foundry)

DeBardeleben Coal Corp., 2201 First Ave., N., Birmingham 3, Ala.
Hickman-Williams & Co., Union Commerce Bldg., Cleveland 14, O.
Pickands, Mather & Co., Cleveland 14, O.
Republic Coal & Coke Co., 8 So. Michigan Ave., Chicago 3, Ill.
Semet-Solvay Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.

COKE (Petroleum)

Republic Coal and Coke Co., 8 S. Michigan Ave., Chicago 3, Ill.

COLLECTORS (Dust)

American Wheelabrator & Equipment Co., Mishawaka, Ind.
American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
Bartlett & Snow, C. O. Co., 6201 Harvard Ave., Cleveland, O.
Kirk & Blum Mfg. Co., Cincinnati 25, O.
Newcomb-Detroit Co., Inc., 5741 Russell St., Detroit 11, Mich.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Corp., 2545 E. 79th St., Cleveland 4, O.
Schneible Co., Claude B., 2827-25th St., Detroit 16, Mich.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

COMBUSTION EQUIPMENT

North American Mfg. Co., 4455 E. 71st St., Cleveland 4, O.

CONCRETE STORAGE BINS

Neff & Fry Co., Camden, O.

CONTROL SYSTEMS (Dust)

American Air Filter Co., 223 Central Ave., Louisville, Ky.
American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

CONVERTER BLOWERS

Roots-Connersville Blower Corp., Connersville, Ind.

CONVERTERS (Bessemer)

Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

CONVEYOR DESIGN

Frank D. Campbell, 332 So. Michigan Ave., Chicago, Ill.
Giffels & Valet, Inc., Marquette Bldg., Detroit, Mich.
Lester B. Knight & Associates, Inc., 600 West Jackson Blvd., Chicago 3, Ill.
Reichert Engineering Co., W. G., 1060 Broad St., Newark, New Jersey.

CONVEYORS (Apron)

Logan Co., 580 Cabel, Louisville, Ky.

CONVEYORS (Belt)

Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Bartlett & Snow Co., C. O., 6201 Harvard Ave., Cleveland 5, O.
Chain Belt Co., 1671 W. Bruce St., Milwaukee 4, Wis.
Godfrey Conveyor Co., Elkhart, Ind.
Imperial Belting Co., 1800 So. Kilbourn Ave., Chicago 23, Ill.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.
Joy Mfg. Co., Joy Division, Pittsburgh, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Logan Co., 580 Cabel, Louisville, Ky.
Mathews Conveyer Co., Ellwood City, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Robins Conveyors Inc., 70 Pine St., New York 5, N. Y.
Standard Conveyor Co., North St. Paul 9, Minn.

CONVEYORS (Chain)

Chain Belt Co., 1671 W. Bruce St., Milwaukee 4, Wis.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.
Joy Mfg. Co., Joy Division, Pittsburgh, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Logan Co., 580 Cabel, Louisville, Ky.
Mathews Conveyer Co., 104 Tenth St., Ellwood City, Pa.

CONVEYORS (Chain) (Cont'd.)

National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Standard Conveyor Co., North St. Paul 9, Minn.

CONVEYORS (Gravity)

Logan Co., 580 Cabel, Louisville, Ky.
Mathews Conveyer Co., 104 Tenth St., Ellwood City, Pa.
Standard Conveyor Co., North St. Paul 9, Minn.

CONVEYORS (Live Roller)

Logan Co., 580 Cabel, Louisville, Ky.
Mathews Conveyer Co., Ellwood City, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Standard Conveyor Co., North St. Paul 9, Minn.

CONVEYORS (Magnetic)

Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

CONVEYORS (Monorail)

American Monorail Co., 13104 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 E. 283rd St., Wickliffe, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Mathews Conveyer Co., 104 Tenth St., Ellwood City, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Penn Iron Works, Reading, Pa.

CONVEYORS (Overhead)

Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Mathews Conveyer Co., Ellwood City, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.

CONVEYORS (Pneumatic)

Fuller Company, Catasauqua, Pa.

CONVEYORS (Portable)

Godfrey Conveyor Co., Elkhart, Ind.
Joy Mfg. Co., Joy Division, Pittsburgh, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.

CONVEYORS (Portable-Gas Electric)

Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.

CONVEYORS (Rubber)

Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Standard Conveyor Co., North St. Paul 9, Minn.

CONVEYORS (Vibrating)

Ajax Flexible Coupling Co., Westfield, N. Y.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Syntron Company, Homer City, Pa.
Simplicity Engineering Co., Durand, Mich.

COPPER

American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.

COPPER SHOT

Alter Company, 1702 Rockingham Rd., Davenport, Iowa.
American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.
Silverstein & Pinsof, Inc., 1720 N. Elston, Chicago 22, Ill.

CORE BINDERS

American Gum Products Co., 500 Fifth Ave., New York 18, N. Y.
Certified Core Oil Div., Socony-Vacuum Oil Co., Inc., Box 151, Chicago 50, Ill.

CORE BINDERS (Cont'd.)

Cities Service Oil Co., 3200 S. Western Ave., Chicago 8, Ill.
Corn Products Sales Co., 17 Battery Pl., New York 4, N. Y.
Dayton Oil Co., Dayton 1, Ohio.
Delta Oil Products Co., Milwaukee 9, Wis.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Hercules Powder Co., Wilmington 99, Del.
International Paper Co., 220 E. 42nd St., New York 17, N. Y.
Chas. A. Krause Milling Co., S. 43rd & Burnham St., Milwaukee, Wis.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia, Pa.
Robeson Process Co., 500 Fifth Ave., New York 18, N. Y.
Werner G. Smith Co., 2191 W. 110th St., Cleveland 2, O.
Swan-Finch Oil Corp., R. C. A. Bldg., West, New York 26, N. Y.
Frederic B. Stevens, Inc., Detroit 16, Mich.
United Oil Mfg. Co., 1429 Walnut St., Erie, Pa.
Velsicol Corp., 330 E. Grand Ave., Chicago 11, Ill.

CORE BLOWING MACHINES

Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Wm. Demmler & Bros., Kewanee, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
International Molding Machine Co., 2608 W. 16th St., Chicago 8, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Randall Corp., Newberg Station, Cleveland 5, Ohio.
Redford Iron & Equipment Co., 21315 W. McNichols Rd., Detroit, Mich.

CORE BOX MACHINES

Wellman Products Co., 1444 E. 49th St., Cleveland 3, Ohio.

CORE BOX (Pins & Bushings)

Wellman Products Co., 1444 E. 49th St., Cleveland 3, O.

CORE BOXES

Diamond Clamp & Flask Co., Richmond, Ind.
Industrial Pattern Works, 2621 Belmont Ave., Chicago 18, Ill.
Master Pattern Co., 1315 Main Ave., Cleveland, Ohio.

CORE BOX VISES

Lehigh Foundries Inc., Easton, Pa.

CORE BREAKERS

Cleco Pneumatic Tool Div., Reed Roller Bit Co., Houston, Texas.

CORE COLORING

Eaton Chemical & Dyestuff Co., 1490 Franklin, Detroit, Mich.

CORE COMPOUND

Certified Core Oil Div., Socony-Vacuum Oil Co., Inc., Box 151, Chicago 50, Ill.
Cities Service Oil Co., 3200 S. Western Ave., Chicago 8, Ill.
Dayton Oil Co., Dayton 1, Ohio.
Delta Oil Products Co., Milwaukee 9, Wis.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
International Paper Co., 220 E. 42nd St., New York 17, N. Y.
Werner G. Smith Co., 2191 W. 110th St., Cleveland 2, O.
Smith Facing & Supply Co., 1857 Carter Rd., Cleveland 13, O.
Frederic B. Stevens, Inc., Detroit 16, Mich.
Swan-Finch Oil Corp., R.C.A. Bldg., West, New York 26, N. Y.
Velsicol Corp., 330 E. Grand Ave., Chicago 11, Ill.

CORE DRAWING MACHINES

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Freeman Supply Co., Toledo 5, O.
Newaygo Engineering Co., Newaygo, Mich.

CORE GRINDERS (Power Operated)

Jeffrey Mfg. Co., Columbus 16, O.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.
D. J. Murray Mfg. Co., Wausau, Wis.
Wadsworth Equipment Co., Akron, Ohio.

CORE KNOCKOUT MACHINES

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Pangborn Corp., Hagerstown, Md.
Simplicity Engineering Co., Durand, Mich.

CORE MAKING MACHINES

Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Wm. Demmler & Bros., Kewanee, Ill.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., 2608 W. 16th St., Chicago 8, Ill.
Milwaukee Foundry Equipment Co., 3228 W. Pierce St., Milwaukee 4, Wis.
Redford Iron & Equipment Co., 21315 W. McNichols Rd., Detroit, Mich.
Wadsworth Equipment Co., Akron, Ohio.

CORE OIL

Buckeye Products Co., 7022 Vine St., Cincinnati 16, O.
Certified Core Oil Div., Socony-Vacuum Oil Co., Inc., Box 151, Chicago 50, Ill.
Cities Service Oil Co., 3200 S. Western Ave., Chicago 8, Ill.
Dayton Oil Co., Dayton 1, Ohio.
Delta Oil Products Co., Milwaukee 9, Wis.
Smith Oil & Refining Co., 1102 Kilburn Ave., Rockford, Ill.
Werner G. Smith Co., 2191 W. 110th St., Cleveland 2, O.
Frederic B. Stevens, Inc., Detroit 26, Mich.
Swan-Finch Oil Corp., R. C. A. Bldg., West, New York 26, N. Y.
United Oil Mfg. Co., 1429 Walnut St., Erie, Pa.
Velsicol Corp., 330 E. Grand Ave., Chicago 11, Ill.

CORE OVENS

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, O.
Despatch Oven Co., Minneapolis 14, Minn.
Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit, Mich.
Foundry Equipment Co., Cleveland 13, O.
Haynes Foundry Equipment Co., 1734 Lake St., Kalamazoo 21, Mich.
Kirk & Blum Mfg. Co., Cincinnati 25, O.
Lanly Company, 750 Prospect Ave., Cleveland 15, O.
Morrison Engineering Corp., 5005 Euclid Ave., Cleveland, Ohio.
Newcomb-Detroit Co., Inc., 5741 Russell St., Detroit 11, Mich.
Porbeck Mfg. Co., 2600 N. 9th St., St. Louis, Mo.
Young Brothers Co., 6508 Mack Ave., Detroit 7, Mich.

CORE PASTE

Corn Products Sales Co., 17 Battery Pl., New York 4, N. Y.
Dayton Oil Co., Dayton 1, Ohio.
Delta Oil Products Co., Milwaukee 9, Wis.
Eastern Clay Products Co., Jackson, O.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

CORE PLATES (Magnesium)

Christiansen Corp., 1 North LaSalle St., Chicago 2, Ill.

CORE PLATES (Steel, Asbestos)

Diamond Clamp & Flask Co., Richmond, Ind.

CORE PLATES (Steel, Asbestos) (Cont'd.)

Johns-Manville, 22 E. 40th St., New York 16, N. Y.
Shanafelt Mfg. Co., 3623 Winfield Way, N. E., Canton 5, Ohio.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.
Truscon Steel Co., Pressed Steel Div., 6100 Truscon Ave., Cleveland, Ohio.
Wadsworth Equipment Co., Akron, Ohio.

CORE RODS

Bethlehem Steel Co., Bethlehem, Pa.

CORE ROD STRAIGHTENING and CUTTING MACHINERY

American Wheelabrator & Equipment Co., Mishawaka, Ind.

CORE SAND

Industrial Silica Corp., Stambaugh Bldg., Youngstown, O.
Standard Silica Corp., 209 So. LaSalle St., Chicago 4, Ill.
Wedron Silica Co., 38 So. Dearborn St., Chicago, Ill.

CORE SAND MIXERS

American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Baker Perkins Inc., Saginaw, Mich.
Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Blystone Division, Standard Sand & Machine Co., 549 W. Washington St., Chicago 6, Ill.
Clearfield Machine Co., Clearfield, Pa.
Freeman Supply Co., 1152 E. Broadway, Toledo 5, O.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Royer Foundry & Machine Co., Kingston, Pa.

CORE STRIPPERS

Stratton Mfg. Co., Erie, Pa.

CORE SPRAYERS

Freeman Supply Co., 1152 Broadway, Toledo 5, O.

CORE TRAYS

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Wadsworth Equipment Co., Akron, Ohio.

CORE TRUCKS

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Clark Tructractor Div. of Clark Equipment Co., Battle Creek, Mich.
Kirk & Blum Mfg. Co., Cincinnati 25, O.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

CORE VENTS

Denmiler, Wm., & Bros., Kewanee, Ill.
P.M.S. Co., 1701 Power Ave., Cleveland 14, Ohio.
Smillie, C. M., & Co., 1100 Woodward Hghts Blvd., Ferndale, Mich.
United Compound Co., Inc., 328 South Park Ave., Buffalo 4, N .Y.

CORE WASH

Asbury Graphite Mills, Asbury, N. J.
Bloomsbury Graphite Co., Bloomsbury, N. J.
Carborundum Co., Perth Amboy, N. J.
Cities Service Oil Co., 3200 S. Western Ave., Chicago 8, Ill.
Corn Products Sales Co., 17 Battery Pl., New York City 4.
Delta Oil Products Co., Milwaukee 9, Wis.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
National Carbon Co., Inc., Carbon Products Div., 30 E. 42nd St., New York 17, N. Y.

CORE WASH (Cont'd.)

Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia, Pa.
Smith Facing & Supply Co., 1857 Carter Rd., Cleveland 13, O.
Smith Oil & Refining Co., 1102 Kilburn Ave., Rockford, Ill.
Stevens, Frederic B., Inc., Detroit 26, Mich.
Superior Flake Graphite Co., 33 S. Clark St., Chicago 3, Ill.
United Oil Mfg. Co., 1429 Walnut St., Erie, Pa.
United States Graphite Co., Saginaw, Mich.

CORE WIRE CUTTERS

Federal Foundry Supply Co., 4600 E. 71st., Cleveland 5, O.

CORE WIRE STRAIGHTENERS

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Federal Foundry Supply Co., 4600 E. 71st., Cleveland 5, O.

COREMAKERS

Wadsworth Equipment Co., Akron, Ohio.

COUPLINGS (Flexible)

Ajax Flexible Coupling Co., Westfield, N. Y.

CRANE LUBRICATING SYSTEMS

Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh, Pa.

CRANES (Bucket)

Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Electric Tramrail)

Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
Robbins & Myers, Inc., Springfield, Ohio.

CRANES (Electric Traveling)

American MonoRail Co., 13104 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div., of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Conco Engineering Works, Mendota, Illinois
Erie Steel Construction Co., Erie, Pa.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Northern Engineering Works, 2615 Atwater, Detroit 7, Mich.
Reading Chain & Block Corp., 2108 Adams St., Reading, Pa.
Robbins & Myers, Inc., Springfield, Ohio.
Shepard-Niles Crane & Hoist Corp., 360 Schuyler Ave., Montour Falls, N. Y.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Gantry)

Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Modern Equipment Co., Port Washington, Wis.
Northern Engineering Works, 2615 Atwater, Detroit 7, Mich.
Wellman Engineering Co., 7000 Central Ave., Cleveland 4, O.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Hand Traveling)

American Monorail Co., 13104 Athens Ave., Cleveland 7, O.
Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Modern Equipment Co., Port Washington, Wis.
Northern Engineering Works, 2615 Atwater, Detroit 7, Mich.
Reading Chain & Block Corp., 2108 Adams St., Reading, Pa.
Robbins & Myers, Inc., Springfield, Ohio.

CRANES (Hand Traveling) (Cont'd.)

Shepard-Niles Crane & Hoist Corp., Montour Falls, N. Y.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Jib)

American Monorail Co., 13104 Athens Ave., Cleveland 7, O.
Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio
Modern Equipment Co., Port Washington, Wis.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

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Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Conco Engineering Works, Mendota, Illinois
Modern Equipment Co., Port Washington, Wis.
Northern Engineering Works, 2615 Atwater, Detroit 7, Mich.
Shepard-Niles Crane & Hoist Corp., 360 Schuyler Ave., Montour Falls, N. Y.

CRANES (Self-Propelled)

Hughes-Keenan Co., Mansfield, Ohio

CRANES (Traction or Tractor)

Silent Hoist & Crane Co., 885 63rd St., Brooklyn 20, N. Y.

CRUCIBLES

Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
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Lava Crucible Co., Pittsburgh, Pa.
National Crucible Co., Mermaid Lane and Queen Sts., Philadelphia 18, Pa.
Ross-Tacony Crucible Co., Tacony, Philadelphia, Pa.
Vesuvius Crucible Co., Swissvale, Pa.

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Campbell-Hausfeld Co., Harrison, O.
Fisher Furnace Co., 2453 West Hubbard St., Chicago 12, Ill.

CRUCIBLE LIFTERS

Modern Equipment Co., Port Washington, Wis.

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CRUSHERS (Core)

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Modern Equipment Co., Port Washington, Wis.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLA BLOWERS

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Eclipse Fuel Engineering Co., 711 So. Main St., Rockford, Ill.
Roots-Connersville Blower Corp., Connersville, Ind.
Spencer Turbine Co., Hartford, Conn.
Westinghouse Electric Corp., B. F. Sturtevant Div., 10 Wall St., New York 4, N. Y.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLA CHARGING MACHINES

American Monorail Co., 13104 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Harnischfeger Corp., Milwaukee 14, Wis.
Modern Equipment Co., Port Washington, Wis.
Shepard-Niles Crane & Hoist Corp., Montour Falls, N. Y.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLA CONTROL EQUIPMENT

Carman, Edwin S., Lee Rd., at Mayfield, Cleveland 18, O.
Foxboro Company, Foxboro, Mass.

CUPOLA DUST ARRESTORS

Schneible Co., Claude B., 2827—25th St., Detroit 16, Mich.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLA LININGS

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Pittsburgh Metals Purifying Co., 1352 Marvista St., Pittsburgh 12, Pa.
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Ajax Metal Co., 46 Richmond St., Philadelphia 23, Pa.
American Smelting & Refining Co., 120 Broadway, New York 5.
Cleveland Flux Co., 1026 Main St., Cleveland 13, O.
Pittsburgh Metals Purifying Co., 1352 Marvista St., Pittsburgh 12, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Niagara Falls Smelting & Refining Corp., 2204 Elmwood Ave., Buffalo 17, N. Y.

DEOXIDIZERS (Ferrous)

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Hercules Powder Co., Wilmington 99, Del.

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Modern Equipment Co., Port Washington, Wis.
Pittsburgh Metals Purifying Co., 1352 Marvista St., Pittsburgh 12, Pa.
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Lester-Phoenix Inc., 2711 Church St., Cleveland 13, Ohio.
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Miller-Taylor Tool Co., 5005 Euclid Ave., Clevelad 3, Ohio.

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Alumicast Corp., 1515 No. Kilpatrick, Chicago 51, Ill.
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Master Pattern Co., 1315 Main Ave., Cleveland, Ohio

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Standard Electrical Tool Co., 2488 Riverside Ave., Cincinnati 4, Ohio.

DRILLS (Pneumatic)

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DRIVES (Reciprocating)

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DRUMS (Magnetic)

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Roura Iron Works, 1405 Woodland Ave., Detroit 11, Mich.

DUMP TRUCKS

Bell Aircraft Corp., Niagara Falls, N. Y.
Phillips Mine & Mill Supply Co., 2227 Jane St., Pittsburgh 3, Pa

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American Wheelabrator & Equipment Co., Mishawaka, Ind.
Bartlett & Snow, C O., Co., 6201 Harvard Ave., Cleveland 5, O.
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Newcomb-Detroit Co., Inc., 5741 Russell St., Detroit 11, Mich
Pangborn Corp., Hagerstown, Md
Parsons Engineering Corp., 2545 E. 79th St., Cleveland 4, O.
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Schneible Co., Claude B., 2827-25th St., Detroit 16, Mich.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Westinghouse Electric Corp., B. F. Sturtevant Div., 40 Wall St., New York 4, N. Y.
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Chas. C. Kawin Co., 431 S. Dearborn St., Chicago 5, Ill.
Lester B. Knight & Associates, Inc., 600 West Jackson Blvd., Chicago 3, Ill.
A. H. Putnam Co., 1319 2nd Ave., Rock Island, Ill.
Reichert, W. G., Engineering Co., 1060 Broad St., Newark, N. J.
Swan, Harry B., 2983 East Grand Blvd., Detroit, Mich.
Westover Engineers, 424 E. Wells St., Milwaukee 2, Wis.
Wickland Co., A. A., 205 W. Wacker Dr., Chicago 6, Ill.

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Industrial Pattern Works, 2621 Belmont Ave., Chicago 18, Ill.
Master Pattern Co., 1315 Main Ave., Cleveland, Ohio.

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Schneible Co., Claude B., 2827—25th St., Detroit 16, Mich.
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Ohio Ferro-Alloys Corp., Canton 2, O.
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Lindberg Engineering Co., 2450 West Hubbard, Chicago 12, Ill.

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Ajax Electrothermic Corp., Trenton, N. J.
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Despatch Oven Co., Minneapolis 14, Minn.
Foundry Equipment Co., 1831 Columbus Rd., Columbus 13, Ohio.
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Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

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Ajax Engineering Corp., Trenton, N. J.
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Detroit Electric Furnace Div. of Kuhlman Electric Co., Bay City, Mich.
Eclipse Fuel Engineering Co., 711 So. Main St., Rockford, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Fisher Furnace Co., 2453 West Hubbard St., Chicago 12, Ill.
Haynes Foundry Equipment Co., 814 Ada St., Kalamazoo 21, Mich.
Johnston Mfg. Co., Minneapolis 13, Minn.
Randall Corp., Newberg Station, Cleveland 5, Ohio.
Stroman Furnace & Engineering Co., 300 W. Adams St., Chicago 6, Ill.
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Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.
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OVENS (Mold)

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
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Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
S. G. Taylor Chain Co., Hammond, Ind.

SLIP JACKETS

Adams Co., Dubuque, Iowa.
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Fremont Flask Co., Fremont, O.
Hines Flask Co., 1324 Hird Ave., Cleveland 7, O.

SMELTERS & REFINERS

American Smelting & Refining Co., 120 Broadway, New York 5.
Christiansen Corp., 1 North LaSalle St., Chicago 2, Ill.
R. Lavin & Sons Inc., 3426 So. Kedzie Ave., Chicago 23, Ill.
Niagara Falls Smelting & Refining Corp., 2204 Elmwood Ave., Buffalo 17, N. Y.

SNAGGING WHEELS—See ABRASIVE WHEELS

SNAP FLASKS

Adams Co., Dubuque, Iowa.
Diamond Clamp & Flask Co., Richmond, Ind.
Hines Flask Co., 1324 Hird Ave Cleveland 7, O.

SODA ASH

Hercules Powder Co., Wilmington 99, Del.
Mathieson Alkali Works, Inc., 60 E. 42nd St., New York 17, N Y.

SOLDER

American Smelting & Refining Co., 120 Broadway, New York 5.

SPECIAL FOUNDRY ALLOYS

Vanadium Corp. of America, 420 Lexington Ave., New York, N. Y.

SPRAY GUNS

Murphy & Co., Jas. A., Hamilton, O.
New Haven Vibrator Co., 131 Chestnut St., New Haven 7, Conn.

SPRUE CUTTERS

Adams Co., Dubuque, Iowa.
Freeman Supply Co., Toledo 5, O.
Milwaukee Chaplet & Mfg. Co., 1023 S. 40th St., Milwaukee, Wis.

STEEL (High Speed)

Bethlehem Steel Co., Bethlehem, Pa.

STEEL (Structural)

Alter Company, 1702 Rockingnam Rd., Davenport, Iowa.
American Bridge Co., Pittsburgh 19, Pa.

STRIPPING MACHINES

Adams Co., Dubuque, Iowa.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
International Molding Machine Co., 2608 W. 16th St., Chicago 8, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee, Wis.

SURFACE TREATMENT METALS

N. Ransohoff, Inc., 208 W. 71st St., Cincinnati 16, O.

TAPER PINS

Standard Horse Nail Corp., New Brighton, Pa.

TEMPERATURE CONTROLLERS

Illinois Testing Laboratories, 418 N. LaSalle St., Chicago 10, Ill.
Marshall Co., L. H., 270 W. Lane Columbus 1, O.

TESTING EQUIPMENT

Detroit Testing Machine Co., 19390 Grinnell Ave., Detroit 13, Mich.

TESTING LABORATORIES

Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.

TESTING MACHINES (Tensile)

Detroit Testing Machine Co., 19390 Grinnell Ave., Detroit 13, Mich.

THERMOCOUPLES

Illinois Testing Laboratories, 418 N. LaSalle St., Chicago 10, Ill.
Marshall Co., L. H., 270 W. Lane, Columbus 1, O.
Pyrometer Instrument Co., 106 Lafayette St., New York 13, N. Y.
Tamms Silica Co., 228 N. LaSalle St., Chicago 1, Ill.

TIERING MACHINES (Power)

Clark Tructractor Div. of Clark Equipment Co., Battle Creek, Mich.

TIMERS (Electric)

Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.

TIN

American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.

TONGS

Industrial Equipment Co., Minster, O.

TOOLS, CUTTING (Carbide)

Beverance Tool Industries Inc., Saginaw, Mich.

TOOLS (Electric Portable)

Skilsaw, Inc., 5000 N. Elston, Chicago 30, Ill.

TOOLS (Pneumatic Portable)

Chicago Pneumatic Tool Co., 8 East 44th St., New York 17, N. Y.
Cleco Pneumatic Tool Div., Reed Roller Bit Co., Houston, Texas.
Dayton Pneumatic Tool Co., Dayton 1, O.
Gardner-Denver Co., Quincy, Ill.
Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Joy Mfg. Co., Sullivan Division, Michigan City, Ind.
Schramm Inc., West Chester, Pa.

TORCHES and BURNERS (Acetylene, gas, oil)

Freeman Supply Co., Toledo 5, O.
Linde Air Products Co., 30 E. 42nd St., New York 17.
North American Mfg. Co., 4455 E. 71st St., Cleveland 4, O.

TOTE BOXES (see "BOXES-TOTE")

TRACTOR (Gas Powered)

Clark Tructractor Div. of Clark Equipment Co., Battle Creek, Mich.

TRAMRAIL SYSTEMS

American MonoRail Co., 13104 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Modern Equipment Co., Port Washington, Wis.

TROLLEYS

Curtis Pneumatic Machinery Co., 1922 Kienlen Ave., St. Louis 20, Mo.
Modern Equipment Co., Port Washington, Wis.

TRUCK BATTERIES (Industrial)

Electric Storage Battery Co., Allegheny Ave. at 19th St., Philadelphia 3, Pa.

TRUCK CRANES

Hughes-Keenan Co., Mansfield, Ohio.
Silent Hoist & Crane Co., 885 63rd St., Brooklyn 20, N. Y.

TRUCKS (Dump)

Phillips Mine & Mill Supply Co., 2227 Jane St., Pittsburgh 3, Pa.

TRUCKS (Power Lift)

Clark Tructractor Div. of Clark Equipment Co., Battle Creek, Mich.

TRUCK WHEELS

Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

TRUCKS (Core Oven)

Foundry Equipment Co., 1831 Columbus Rd., Columbus 13, Ohio.

TUMBLING BARRELS

Cleveland Chaplet & Mfg. Co., 1197 West 67th St., Cleveland 2, O.
Haynes Foundry Equipment Co., 814 Ada St., Kalamazoo 21, Mich.
N. Ransohoff Inc., 208 W. 71st St., Cincinnati 16, O.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

TURNTABLES

Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Modern Equipment Co., Port Washington, Wis.
Newaygo Engineering Co., Newaygo, Mich.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

VALVES (Air, Water, Steam)

Air-Way Pump & Equipment Co., 1050 N. Kilbourn, Chicago, Ill.
Cleveland Vibrator Co., 2828 Clinton Ave., W., Cleveland 13, Ohio.
Flex Rite Valve & Mfg. Co., Tulsa 3, Oklahoma.
North American Mfg. Co., 4455 E. 71st St., Cleveland 4, O.

VALVES (Adjustable Orifice)

North American Mfg. Co., 4455 E. 71st St., Cleveland 4, Ohio.

VALVES (Blow-off and Cut-off)

Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Cleveland Vibrator Co., 2828 Clinton Ave., W., Cleveland 13, Ohio.
Wm. H. Nichols Co., Richmond Hill, Long Island 18, N. Y.

VALVES (Oxygen, Acetylene)

Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

VENTILATING SYSTEMS

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Joy Mfg. Co., La-Del Division, New Philadelphia, Ohio.
Newcomb-Detroit Co., Inc., 5741 Russell St., Detroit 11, Mich.
Pangborn Corp., Hagerstown, Md.
Propellair Inc., Springfield, Ohio.
Schneible Co., Claude B., 2827—25th St., Detroit 16, Mich.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland 2, O.
Swartwout Co., 18511 Euclid Ave., Cleveland 15, Ohio.
Westinghouse Electric Corp., B. F. Sturtevant Div., 40 Wall St., New York 4, N. Y.

VENTILATORS (Roof)

Swartwout Co., 18511 Euclid Ave., Cleveland 15, Ohio.

VENTS (Core Box)

Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Demmler & Bros., Wm., Kewanee, Ill.
C. M. Smillie & Co., 1100 Woodward Hgts. Blvd., Ferndale, Mich.

VIBRATION REDUCTION PADS

Fabreeka Products, Inc., 222B Summer St., Boston, Mass.

VIBRATORS

Adams Co., Dubuque, Iowa.
Beardsley & Piper Co., 2424 No. Cicero, Chicago 39, Ill.
Cannon Vibrator Co., 111 Power Ave., Cleveland 14, Ohio.
Cleveland Vibrator Co., 2828 Clinton Ave., W., Cleveland 13, Ohio.
Davenport Machine & Foundry Co., Davenport, Iowa.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundry Supplies & Mfg. Co., 2221 Orchard St., Chicago 14, Ill.
Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee, Wis.
New Haven Vibrator Co., 131 Chestnut St., New Haven 7, Conn.
Nichols Co., Wm. H., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
S P O Incorporated, 7500 Grand Division Ave., Cleveland 5, O.
Syntron Company, Homer City, Pa.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

VIBRATORS (Core Bench)

Cleveland Vibrator Co., 2828 Clinton Ave., W., Cleveland 13, Ohio.

VISES (Air Operated)

Van Products Co., Erie, Pa.

WASH ROOM EQUIPMENT

Bradley Washfountain Co., Box 732, Milwaukee 1, Wis.

WAX (Core, Vent, Pattern)

P.M.S. Co., 1701 Power Ave., Cleveland 14, Ohio.
United Compound Co., Inc., 328 South Park Ave., Buffalo 4, N. Y.

WEDGES (Foundry)

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

WELDING GAS

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

WELDING APPARATUS (Electric Arc)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

WELDING and CUTTING APPARATUS and SUPPLIES

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

WELDING ELECTRODES (Carbon)

National Carbon Co., Carbon Products Div., 30 E. 42nd St., New York 17, N. Y.

WELDING RODS & ELECTRODES

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
International Nickel Co., Inc., 67 Wall St., New York 5, N. Y.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

WHEELBARROWS

Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

WHEELS, ABRASIVE (Cut-off)

Bay State Abrasive Products Co., Westboro, Mass.
Carborundum Co., Perth Amboy, N. J.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Raybestos Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J.
Norton Company, Worcester 6, Mass.
Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit, Mich.
Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa.
Sterling Grinding Wheel Division, Cleveland Quarries Co., Tiffin, Ohio.

WHEELS (Wire)

Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

WIRE BENDERS

Redford Iron & Equipment Co., 21315 W. McNichols Rd., Detroit, Mich.

WIRE BRUSHES

Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

WIRE CUTTERS

Redford Iron & Equipment Co., 21315 W. McNichols Rd., Detroit, Mich.

WOODWORKING MACHINERY

Do All Company, Des Plaines, Ill.
Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Oliver Machinery Co., Grand Rapids 2, Mich.
Parks Woodworking Machine Co., 1546 Knowlton St., Cincinnati 23, Ohio.

X-RAY EQUIPMENT

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

X-RAY FILMS

Eastman Kodak Co., Rochester, N. Y.

ZINC

American Smelting & Refining Co., 120 Broadway, New York 5, N.Y.

—*When writing advertisers, please mention* THE FOUNDRY—

Classified Advertising

Help Wanted

HELP WANTED

"A completely new and modern gray iron foundry of the automotive type located in the middle west is interested in filling the positions listed below. Applicants are requested to submit information outlining qualifications, both education and experience, in detail."

"**Assistant Foundry Superintendent** capable of establishing and maintaining a production control system, familiar with all phases of foundry practices and possessing an aptitude for handling labor relation problems."

"**Foundry Foreman** with experience in and thorough knowledge of all mechanical molding procedures, (Jolt Roll Over, Traveling Slinger, Squeeze Molding, etc.)."

"**Foundry Metallurgist** with a thorough knowledge of cupola practices and capable of directing cupola operations."

"**Foundry Engineer** with complete knowledge of Foundry layout and mechanical foundry equipment in general."

BOX 834
The FOUNDRY CLEVELAND 13, OHIO

BRONZE FOUNDRY FOREMAN

For new modern foundry on art bronze castings, skin dried, dry sand and core assembly molds. Able to train molders and coremakers in the casting of bronze tablets, honor rolls, grave markers and commercial plates and signs. Must have practical background. Position has wide opportunity for advancement.

BOX 783
THE FOUNDRY CLEVELAND 13, OHIO

GREY IRON FOUNDRY
SUPERINTENDENT

For a modern production and jobbing grey iron foundry located in the Middle West, employing over 200 men. We desire a man with a sound background of modern foundry practices and who has had successful supervisory experience. Will pay the right man substantial salary and a bonus.

BOX 847
The FOUNDRY CLEVELAND 13, OHIO

SALESMEN—DISTRIBUTORS—DEALERS

Selling metal trades to represent well established, leading foundry producing quality aluminum and magnesium sand, permanent mold and die castings on commission basis. Reply with details.

BOX 849
The FOUNDRY CLEVELAND 13, OHIO

FOUNDRY FOREMAN

For progressive gray iron, brass and aluminum foundry located in the South with unlimited possibilities for expansion. Must be capable of handling both job and production work. Must be able to organize and handle men, understand cupola thoroughly, knowledge of metallurgy in order to produce castings to required analysis and core room knowledge. Good climate and splendid opportunity. State age, salary and experience. Address: Box 852, The FOUNDRY, Cleveland 13, Ohio.

Help Wanted

METAL PATTERNMAKER

Must be first class man in a small pattern shop located in the Midwest. Good opportunity for a good man to head up the Metal Department of a progressive and growing pattern shop. Address: Box 842, The FOUNDRY, Cleveland 13, Ohio.

GENERAL FOUNDRY FOREMAN

Want an experienced, aggressive man for a mechanized malleable foundry. Must be able to get maximum production, keep scrap at low level and be able to handle men. State age and experience, stressing supervisory experience in molding. Good opportunity. Address: Box 836, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY EXECUTIVE

Capable of completely operating and managing grey iron foundry with reasonable amount of capital to invest in it. Foundry now operating. Have materials and customers. Address: Box 859, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Man to take over and operate on a profit sharing basis well equipped grey iron foundry. Small investment required for materials and operating capital. Will have complete charge and management. Address: Box 860, The FOUNDRY, Cleveland 13, Ohio.

SALES REPRESENTATIVE

Well established foundry supply concern desires sales representative for Northeastern Ohio and Western Pennsylvania territory. Complete line of supplies and equipment carried. Many established accounts will be immediately assigned. State experience and qualifications for position and salary requirements. Address: Box 851, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOREMAN

To take charge of molding in a well established grey iron foundry located in Southern Ohio, producing high quality castings. Must be experienced in jolt rollover and squeezer machine work, understand gating and risering; side floor green sand and medium heavy dry sand. This is a good connection for a reliable man that can qualify. Address: Box 881, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

PATTERNMAKER

First class on wood and metal, capable of estimating work, layout and make or supervise all work in shop. Capable of taking over shop as working foreman in small shop or supervise large shop. 35 years' pattern shop and foundry work on patterns with production work and job patterns. Employed now. Desire change with more responsible job where knowing patterns and how to make patterns is desired. Experience with core blowing, gates and matchplates. Address: Box 782, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERVISOR

Qualified and experienced supervisor desires connection with progressive company. Eighteen years of practical foundry experience. Presently employed as superintendent of gray iron jobbing and production shop. Thirty-seven years of age. Address: Box 865, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY EXECUTIVE

DESIRES CONNECTION WITH PROGRESSIVE FOUNDRY. AGE 42, MARRIED. 22 YEARS PRACTICAL EXPERIENCE IN CASTING STEEL, HIGH ALLOYS AND IRON. SEVEN YEARS IN RESPONSIBLE POSITIONS WITH EXCELLENT RECORD. AT PRESENT TIME SUPERINTENDENT IN MID-WESTERN COMPANY. ADDRESS: BOX 814, THE FOUNDRY, CLEVELAND 13, OHIO.

TIME STUDY MAN

Estimator and standard setter with experience in foundry where incentive system is used is now open for position. Address: Box 857, The FOUNDRY, Cleveland 13, Ohio.

ALUMINUM PERMANENT MOLD FOUNDRY ENGINEER

TWENTY-FIVE YEARS' EXPERIENCE. COOKING UTENSIL SPECIALIST OR ANYTHING YOU WANT MADE. FULL OR PART TIME. ADDRESS: BOX 667, THE FOUNDRY, CLEVELAND 13, OHIO.

Positions Wanted

FOUNDRY SUPERINTENDENT

Eighteen years of practical foundry experience. Presently employed as foundry superintendent of gray iron foundry. Under forty, good references. Address: Box 866, The FOUNDRY, Cleveland 13, Ohio.

IRON AND BRASS FOREMAN

Sixteen years' experience in foundries, last six years as foreman over synthetic sands, conveyor squeeze molding, continuous melting, alloy, semi-steel, all steel and all scrap cupola mixtures. Age 36, married, physically fit, available at once on week or month trial basis. Address: Box 855, The FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRY OPERATOR

Experienced manager with a qualified record in production and sales of diversified quality castings, either continuous or conventional operation. Prefer foundry that can make full use of a seasoned and mature background. Address: Box 773, The FOUNDRY, Cleveland 13, Ohio.

SAND CONTROL

Young married man, 10 years' sand control experience in mechanized jobbing foundries. Intensive knowledge of core sands, core sand additions, core oils, synthetic resins, molding sands both natural and synthetic, core blowing system sands, core sand reclamations and foundry practice. Excellent references. Address: Box 779, The FOUNDRY, Cleveland 13, Ohio.

STEEL MILL ELECTRIC FURNACE MELTER

Now employed, desires change. 39 years old, some open hearth experience, 15 years electric furnace experience, last ten years as melter. Address: Box 841, The FOUNDRY, Cleveland 13, Ohio.

REGISTERED PATENT AGENT

Chemist, two scientific degrees, extensive patent experience in chemical, metallurgical and mechanical arts, available for part-time work. Address: Box 856, The FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT OR ASSISTANT

Over 20 years in foundry work. Age 38. Experienced in semi-steel and alloyed cast iron. Ten years foreman and superintendent. Many years control of foundry sands. Familiar with cupola operation, foundry equipment, methods and costs. Address: Box 762, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN

Over 17 years in foundry work. Now employed but desire new connection. Experienced in steel and alloyed cast iron. Served as supervisor. Control of foundry and core sands. Familiar with general melting practice, foundry equipment, methods and cost. Address: Box 848, The FOUNDRY, Cleveland 13, Ohio.

MAINTENANCE ENGINEER

Having 22 years of foundry experience would like to have the opportunity of operating a small mechanized grey iron foundry. Address: Box 867, The FOUNDRY, Cleveland 13, Ohio.

CORE ROOM FOREMAN

With over 30 years in supervisory capacity. Can set up and operate efficiently production core department. Experienced in gray iron, steel, brass, aluminum, etc. Good labor relations record. Experienced in latest type equipment and foundry technique. Address: Box 850, The FOUNDRY, Cleveland 13, Ohio.

PATTERN SHOP SUPERVISOR WOOD & METAL

Six years' experience in corporation shop; 23 years in jobbing shop; 5 years successful owner and manager of bronze and aluminum foundry. Address: Box 846, The FOUNDRY, Cleveland 13, Ohio.

GENERAL MANAGER

Mature, profit-minded, dependable. Has successfully managed four companies—two taken out of the red. Available for service shortly with medium-size company requiring reliable directing ability in management, sales finance and production. Excellent experience, foundry, machine and related lines. Address: Box 871, The FOUNDRY, Cleveland 13, Ohio.

Classified Advertising

Positions Wanted

CHIEF METALLURGIST

Very capable chief metallurgist, steel roll maker and qualified foundry manager seeks association with highly rated firm. Presently employed in key position by leading steel company. Address: Box 843, The FOUNDRY, Cleveland 13, Ohio.

FOREMAN

Desires position as foreman or superintendent. Practical man. Twenty-two years' experience from molder to foreman gray iron or non-ferrous, soil pipe and fittings. Prefer Western or Central New York. Address: Box 868, The FOUNDRY, Cleveland 13, Ohio.

MAINTENANCE SUPERINTENDENT AND FOUNDRY ENGINEER

Very wide experience practical and technical in supervision of maintenance and layout of all types machinery and modern sand equipment, excellent record in industrial relations, complete knowledge of foundry operation. Desire change. Address: Box 872, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Practical molder and core maker with 26 years' experience as foundry superintendent. All classes of jobbing, rollover and squeezer. Mix by analysis. At present employed. Address: Box 869, The FOUNDRY, Cleveland 13, Ohio.

TECHNICAL SALES REPRESENTATIVES

Successful executive desires to represent manufacturer of industrial furnaces and ovens or specially engineered processing equipment preferably in Ohio. Thoroughly experienced in design, manufacture and sales. Address: Box 838, The FOUNDRY, Cleveland 13, Ohio.

PRACTICAL FOUNDRYMAN

With 15 years' sales experience to foundry trade would like one or two lines on commission in Chicago area where well acquainted. Address: Box 870, The FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOREMAN

Wants position in medium size shop. Now foreman in California. Address: Box 800, The FOUNDRY, Cleveland 13, Ohio.

PERMANENT MOLD ENGINEER

Experienced in all phases of aluminum work. Young, capable, excellent technical and practical background. Address: Box 874, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY EXECUTIVE

Capable, progressive grey iron foundryman now employed desires to make a change. Have 23 years of experience covering all phases of the business. Understand foundry costs thoroughly and can apply this knowledge to very good advantage. Desires to make a contact with an organization who wishes to secure ambitious, capable and honest man. Age 44 years. Address: Box 876, The FOUNDRY, Cleveland 13, Ohio.

SALESMAN

Foundry executive now employed and having 26 year's experience in all phases of the grey iron foundry business. Will consider a sales position with a successful foundry supply company. Prefer Central New York state territory. Address: Box 877, The FOUNDRY, Cleveland 13, Ohio.

Opportunities

OPPORTUNITY

Experienced man on bronze and aluminum to form a partnership in opening a small foundry in upstate New York. Large manufacturer is getting out a new line requiring large tonnage of bronze and aluminum castings. No bronze foundry within twenty miles. This foundry can be started with a minimum of capital and expanded to meet increased demand. Only a man capable of producing quality castings should reply. All correspondence held in strict confidence. Address: Box 863, The FOUNDRY, Cleveland 13, Ohio.

OPPORTUNITY

We can furnish empty tight and slack wooden barrels also steel drums for your products. ADDRESS: BUCKEYE COOPERAGE STATION, C.P.O. BOX 1501, CLEVELAND, OHIO.

Opportunities

90 PER CENT OF THE CUPOLAS MELT UP TO ONLY 50 TO 60 PER CENT

capacity per hour—although the best and hottest iron is produced only when cupola is operated to its capacity. Report on your cupola may prove an eye-opener—usually the savings are surprising. Every pound of steel used in cupola mixtures reduces cost and increases strength 20 to 60%, because steel is purer than the most expensive pig iron. Watch the scrap pile—statistics prove casting losses can be held between 1 to 5% depending on the line of work. Our system is not an expense—but a valuable investment. Synopsis free.

McLAIN'S SYSTEM INC.
236 E. NORTH AVE.
MILWAUKEE, 12, WIS.

OPPORTUNITIES

Permanent mold consulting service. Reasonable rates for consultation on permanent mold problems. Complete assistance in pricing, mold design, operation, personnel training and trouble shooting. Ideal setup for foundry unable to support full time staff. Eastern area. Address: Box 875, The FOUNDRY, Cleveland 13, Ohio.

Employment Service

SALARIED PERSONNEL

$3,000—$25,000. This reliable service, established 1927, conducts confidential negotiations for high-grade men who seek a change of connection under conditions assuring, if employed, full protection in present position. Send name and address only for details. Personal consultation invited. Address: JIRA THAYER JENNINGS, 241 ORANGE STREET, NEW HAVEN 10, CONN.

SALARIED POSITIONS
$3,500 & UPWARD

If you are considering a new connection communicate with the undersigned. We offer the original personal employment service (38 years recognized standing and reputation). The procedure, of highest ethical standards, is individualized to your personal requirements and develops overtures without initiative on your part. Your identity covered and present position protected. Particulars on request.

R. W. BIXBY, INC.
101 DUN BLDG. BUFFALO 2, N. Y.

Accounts Wanted

ACCOUNTS WANTED

Foundry equipment and materials accounts wanted by well organized sales company covering entire foundry industry on Pacific Coast. We are making appointments for interviews at AFA Convention, Philadelphia. Address: Box 854, The FOUNDRY, Cleveland 13, Ohio.

CASTINGS ACCOUNTS WANTED

Long, well established manufacturer's agent covering the Michigan and Northern Ohio area is desirous of obtaining additional lines of castings, forgings or stampings. Address: Box 880, The FOUNDRY, Cleveland 13, Ohio.

Foundries for Sale

GREY IRON FOUNDRY

Capacity 90 ton per month, 5500 cu. ft. of floor space, 9 floors, fireproof pattern storage building, separate office building, big scrap, pig iron and coke yard. Located in West-Central Illinois. Address: Box 835, The FOUNDRY, Cleveland 13, Ohio.

GREY IRON FOUNDRY FOR SALE

Complete with pattern and machine shop. Going business with 27 years' successful operation. Ideal location in growing industrial section of Texas. Well established demand for product. Price $125,000. Terms. Address: Box 612, The FOUNDRY, Cleveland 13, Ohio.

Foundries for Sale

FOR SALE

Grey Iron Foundry in central New York State. 27" cupola, pattern and machine shop. Cinder Block Building; 4 acres land.

Ideal Location: Main highway 100 ft. from shipping room; easy access to railroad from rear of building.

Now employ 22 men—pleasant labor relations. Melting 5½ tons per day and showing exceptional profits. Will show books to potential buyer. Substantial supply of pig iron and coke on hand. Contracts on hand for future deliveries.

Large back-log of orders on hand; good, steady customers.

This is an unusual opportunity. Contact us for further details.

BOX 833
The FOUNDRY CLEVELAND 13, OHIO

FOUNDRIES FOR SALE

Well equipped gray iron foundry. Produces 25 tons of castings daily. Very profitable. Reasonably priced. We also have smaller foundries to offer.

EDWARD H. ZOLL
790 BROAD ST., NEWARK 2, N. J.
MARKET 3-4539

FOUNDRY FOR SALE

Squeezer Shop—New concrete and steel building, 10,000 square feet, good equipment, 10 ton per day capacity. Three acres with rail siding, inventory in yard. Address: Mr. John Budde, 9116 Jackson Park Blvd., Wauwatosa, Wisconsin.

FOR SALE

Manufacturing plant and production foundry combined, manufacturing farm implements. Address: Box 845, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Gray iron foundry, Northeastern Oklahoma. Operated continuously since 1910. Fully equipped, leased rail siding, pattern coke and sand storage. Doing good business. Address: Box 840, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOR SALE

Located in Michigan in city of 175,000 population, centrally located. Foundry and yards cover ⅔ of block area. Capacity 25 tons per day of light squeezer castings. Buildings in first class condition. Overhead charger, 20,000 sq. ft. of molding space, 24,000 sq. ft. of core room and storage space. Gas ovens, core blowers, sand mixers. Separate building with 3600 sq. ft. of storage and pattern millwright and carpenter shop equipped. Address: Box 853, The FOUNDRY, Cleveland 13, Ohio.

GREY IRON FOUNDRY

Large, well equipped production squeezer foundry. Have materials and customers. We have it, but lack the ability to operate it. Will sell, trade, sell a portion of or what have you to suggest? Address: Box 858, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Aluminum jobbing foundry, central Ohio. Owner retiring, good business and low lease rental, also make and sell castings from patterns owned by foundry. Address: Box 873, The FOUNDRY, Cleveland 13, Ohio.

Wanted-To-Buy

WANTED

Roller conveyor 12", 18" and 24",
Wide, heavy-duty, minimum 2 5/16" roller—will also consider powered units.
Core blowers, Demler, International or Osborn.
Transite core plates #2, #3 or #4 cupolas.
Sand system components.
Elevators, skips, belts, etc.
Pouring devices, ladles, etc.

BOX 844
The FOUNDRY CLEVELAND 13, OHIO

WANTED

Core blower, suitable for 2# production work; patterns for soil pipe fittings 2" to 6", aluminum snap flasks, etc. Address: Box 861, The FOUNDRY, Cleveland 13, Ohio.

Classified Advertising

Wanted-To-Buy

WANTED

Patterns for cannon and laundry stoves from 10" up to 16" in pot diameter sizes including purchasing 15 ton of castings for our monthly requirements. Address: Box 879, The FOUNDRY, Cleveland 13, Ohio.

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price for immediate acceptance. Address Box 578, The FOUNDRY, Cleveland 13, Ohio.

Capacity Wanted

CAPACITY REQUIRED

Manufacturer of plumbing specialties requires source to manufacture sink traps, including machining and possibly chrome plating. Volume runs. Have aluminum matchplates and core boxes adapted for core blowing. Many other items. Address: Box 765, The FOUNDRY, Cleveland 13, Ohio.

Open Capacity

CASTINGS

Grey Iron
10 to 300 lbs.

FISHER & NORRIS
TRENTON, N. J.

CASTINGS AND MANUFACTURE

Gray iron, brass and aluminum castings, light stampings, assembly, machine shop and engineering design if necessary. Address: MR. N. H. MINGLEDORF, SAVANNAH MACHINE & FOUNDRY CO., SAVANNAH, GEORGIA.

PATTERNS

Northern Ohio Shop with modern equipment and real patternmakers can take wood and metal patterns, large and small and real metal cope and drag equipment with core blowing and driers that produce castings at lowest possible cost to your foundry. Address: Box 821, The FOUNDRY, Cleveland 13, Ohio.

OPEN CAPACITY

Open capacity in grey iron foundry. Waterfronts—burners—bench, pumper and floor work. Address: P.O. Box 321, Belleville, Illinois.

AVAILABLE CAPACITY

Our foundry has open capacity to supply small and medium size gray iron castings. Send sample. Address: OREGON CASTINGS CO., RD 3, Lititz, Pa.

CAPACITY

Company with automatic sand handling foundry for squeezer work desires a connection with user of volume products. Address: Box 792, The FOUNDRY, Cleveland 13, Ohio.

PATTERNSHOP

Part interest or take over your present patternshop or job shop as separate department. Twenty-five years' experience with wood metal patterns. First class mechanic on bench and working foreman. Address: Box 689, The FOUNDRY, Cleveland 13, Ohio.

STEEL FABRICATING BUILDING

150' x 580'—80' high
Complete with 10 ton O.H. Crane and Runways in two bays. Corrugated transite roofing and siding, steel sash.
All in excellent condition.
IRON & STEEL PRODUCTS, INC.
43 years' experience
"*ANYTHING* containing IRON or STEEL"

For Sale

OVERHEAD CRANES

1—7½ ton Morgan, 46'6" span, cab operated 230 volts D.C.

2—10 ton American Monorail, floor operated 3/60/220 A.C.—WITH RUNWAY.

IRON & STEEL PRODUCTS, INC.

43 years' experience

13444 S. Brainard Ave., Chicago 33, Ill.

"*ANYTHING* containing IRON or STEEL"

FOR SALE

Paxson cupola
Pangborn sand blast room No. 55, type "NF" suction type, complete with dust collector and classifier type "CH"
Also a quantity of Louden track and hangers.
All items in excellent condition.

BUFFALO SCALE COMPANY, INC.
BUFFALO 13, NEW YORK

FOR SALE

6—Adams portable jolt squeezers—side rod type —10" x 32"
2—Adams portable jolt squeezers—side rod type —12" x 38"
Each equipped ⅝" Adams vibrator. Market price. Never used.

BOX 816
The FOUNDRY CLEVELAND 13, OHIO

FOR SALE

One Detroit type AA, 1000 lb. cold metal charging capacity, 220/3/60 motor and controls, transformer 12,000 volts, primary control panel. Good condition. No longer needed.

THE DURIRON CO., INC.
PUR. DEPT.
DAYTON 1, OHIO

FOR SALE

One (1) new Whiting model B #1 cupola, 45' high, with spark arrester. Cupola arranged to take a 4½" thick lining and is complete with tuyeres, bottom doors, charging doors and structural steel legs. 2'6" distance from foundation to bottom of tap spout. Address: PEARSON CONSTRUCTION CO., INC., P.O. BOX 635, BENTON HARBOR, MICHIGAN.

TWO USED CONNERSVILLE CUPOLA BLOWERS

1—Output 65 cu. ft. per rpm, measuring 24" inlet, 16" outlet.
1—Output 24 cu. ft. per rpm, measuring 18" inlet, 6" outlet.
Make offer.

GEO. J. MEYER MANUFACTURING COMPANY
SOUTH MEYER PLACE & EAST DUMORE COURT, CUDAHY, WISCONSIN

FOR SALE

1—#2 Whiting cupola complete with motor and blower in good shape. Has been used several years. Can ship same on short notice. Price $1600.00. Address: Box 878, The FOUNDRY, Cleveland 13, Ohio.

For Sale

FOR SALE

1 Sand blast room, "Pangborn", mod. MT-3 w/ 2'6" x 6'6" door, compl. w/ floor hopper, bucket type elevator, conveyor, abrasive separator, roto-active table, blast cleaning hose, dust collector, 10 hp, 3 hp & ½ hp mtrs. & control.
1 Sand blast cabinet "W. Sly" 8' W x 8' L. x 7' H compl. w/ 6' turntable, mtrs., exhaust system & controls.
1 100 ton, 2 comp. storage bin, ¼ plate with one Comp. for 60 tons system sand and one Comp. for 40 tons, new sand, w/ 16 x 18 duplex gate.
1 Batch Hopper traveling, 12 x 12 gate with track & supports.
1 Screen, revolving "P. Bee" 4' dia. x 9' long drum incl. #HDS speed reducer, less mtr., 7/16 dia. opening .135 wire.
5 Casting machines, centrifugal spinner type for bearings, compl. with 2 hp mtrs.
1 Chip extractor "DeLaval" compl. w/ 3 hp mtr.
1 furnace, heat treat, salt bath-elec. "Upton Elec."—tank size 80" L x 44½" x 36½" H incl. transformer, 240 V to 18.4 V.
1 Furnace, heat treat—elec. "Elec. Furn. Co." 300 KW, compl.
1 Furnace, preheat continuous "Industrial Circ-Air" gas fired, 30" W x 12' L incl. 1 hp mtr. & blower (less burner, mtr. & conts.)
1 Furnace, preheating "Industrial" gas fired 43½" W x 39½" D x 37½" H (less burners & door).
4 Furnace, melting — 1200# cap. "Hausfeld" Mag-Tilt, gas fired incl. burner (less lining).
3 Furnace, melting—pot type gas, 24" x 32" x 40" H overall less control.
1 Furnace, preheating oven type "American" #1 gas fired 8" D x 10" H x 14" L.
1 Oven, normalizing "Deway" recirc. radiant tube—gas.
6 Furnaces, box type annealing "Hoskins" mod. 252 elec. 2000° F. preheating compl. (less pyrometer).
2 Pump rotary—low pressure—2½" inlet. 2" discharge.
1 Blower, "Buffalo Forge" size 6.
1 Blower, "American Sirocco" size 7.
1 Pump, centrifugal 1½ w/ 5 hp mtr.
1 Chip handling system complete with electric bucket elevator.
1 Hoist-Air, 3 ton "Ingersoll Rand", size D-6.
3 Hoists—Electric, 1 Ton "Detroit", type M5S. Trolley type with one 1½ HP motor.
1 Crane, 3 ton, 2 motor, bridge type "Detroit" model I.G.S., span 47' 10" with 3 ton hoist.

BOHN ALUMINUM & BRASS CORP.
1100 LAFAYETTE BUILDING
DETROIT 26, MICH.

FOR SALE

6 #275J Osborn Jolt Squeezers
1 8' Sly Centi Blast Table
1 Electric Enameling Oven
1 Iron Separator
All Steel Flasks as Follows:

150 16"x10"x4"	Cope 4"	Drag 4"
180 15"x15"x4"	Cope 4"	Drag 4"
40 18"x19"x5"	Cope 5"	Drag 5"
60 16"x16"x5"	Cope 5"	Drag 5"
90 12"x22"x4"	Cope 4"	Drag 4"
260 16"x16"x4"	Cope 4"	Drag 4"
30 10"x16"x6"	Cope 6"	Drag 6"
40 12"x22"x5"	Cope 5"	Drag 5"
140 12"x18"x4"	Cope 4"	Drag 4"
30 11"x22"x4"	Cope 4"	Drag 4"
7 15"x15"x8"	Cope 8"	Drag 8"
310 24"x26"x6"	Cope 6"	Drag 6"

On the 24"x26" both cope and drag fitted with trunions.
Large quantity steel adjustable flask clamps.

WASHINGTON FILLMORE FOUNDRY INC.
153 FILLMORE AVE.
BUFFALO, N. Y. 10

FOR SALE

Snap flasks both new and used. Reasonably priced. Send for list and prices. Address:

STANLEY TOY CO.,
OCONTO, WIS.

6 ton Capacity
HEROULT ELECTRIC FURNACE
Tilting Type
1, 6 ton shell—1, 3 ton shell
Complete with all electrical controls.
IRON & STEEL PRODUCTS, INC.
43 years' experience
13444 S. Brainard Ave., Chicago 33, Ill.
"*ANYTHING* containing IRON or STEEL"

Classified Advertising

For Sale

FOR IMMEDIATE SALE

Entire equipment of Gray Iron Foundry. All machinery in excellent shape. Lots of new equipment, never used.

1. Beardsley Piper #60 Speed Mullor with 75 H.P. Continental Motor, 220 V., 3 Ph., 60 Cycle, and G.E. Compensator & Line Switch.
2. Robins Shakeout 60" x 72" with 7½ H.P. F.B.-B.B. motor, 220-440 V., 60 Cycle, 3 Ph., 1740.
3. Royer Separator Sand Cutter, 220 V., 3 Ph., 60 Cycle.
4. Complete Sand Handling System with belts, hoppers, plows, elevators, etc.
5. One Stears Magnetic Pulley Code 1820—22" face, 18" Dia., with anti-friction bearings.
6. One K.W. Motor Generator with motor starting switch and rheostat, 220-440 V., 3 Ph., 60 Cycle.
7. Pangborn Type CH-2 Dust Collector with #3 end fan house extension.
8. Four Transfer Bridges. Four Ingersoll-Rand, Size D, 2-ton Hoists.
9. $6000 worth of Matthews Roller Conveyors (New).
10. One Pangborn Blast Room #43 Type N.F. with all accessories.
11. One Pangborn Blast Barrel "2GF" with dust collector.
12. Dietert Sand Control Equipment.
13. Two Bellevue Aluminum Melting Furnaces #321.
14. Squeezers, both Osborne and Tabor.
15. One Ingersoll-Rand Type ES-1 Compressor 14" cyl. 13" stroke, 275 R.P.M., 100 lb. pressure, with 1-100 H.P. G.E. S.B. motor, 220 V., 60 Cycle, 3 Ph., 1180 R.P.M. and Cutler-Hammer Compensator
16. One Coleman Core Oven, Core Racks and Trays, Ross Core Drawers, Flasks, Grinders, Ladles, Motors.

BOX 882
The FOUNDRY CLEVELAND 13, OHIO

OVERHEAD ELECTRIC TRAVELING CRANES

TONS	MAKE	SPAN	CURRENT
3	Shepard	18'6"	230-VDC.
3	Northern	36'0"	220-VAC.
5	Northern	22'0"	230-VDC.
5	Northern	26'0"	230-VDC.
5	Milwaukee	50'0"	230-VDC.
15	Alliance	102'0"	220-VAC.

(With (2) 7½-ton Trolleys)

ELECTRIC MONORAIL HOISTS

QU.	TONS	MAKE	CURRENT
*	½	Lo-Hed & Shepard	230-VDC.
1	1	Shaw-Box	220-VAC.
1	2	Shepard	230-VDC.
1**	2	Shepard	220-VAC.
1*	2	Shepard	230-VDC.
3*	3	Lo-Hed	230-VDC.
1*	5	Lo-Hed	220-VAC.

*—2-Motor, Fl. Op. **—2-Motor, Cg. Op.

ALL ABOVE IN STOCK OFFERED REBUILT & GUARANTEED.

SEND FOR OUR STOCK LIST OF A.C. & D.C. GENERAL PURPOSE CRANE & MILL MOTORS, ELECTRIC BRAKE & CONTROL EQUIPMENT, MOTOR GENERATOR SETS, TRANSFORMERS, ETC., OF ALL SIZES.

T. B. MACCABE COMPANY
4300 CLARISSA ST.
PHILADELPHIA (40), PENNA.

FOR SALE

1—Sly Dust Collector—13,600 FM
1—A-2 Hebard Shop Mule
1—A-4 Brinnell tester
1—1½ Ton Cleveland Crane with Monorail and Hoist
2—No. 4 Fox 2 Speed Swing Grinders
1—3—R W Hammond Grinder
10—8 Point Recording Controller Potentiometers
1—5' x 8' Simplicity Shakeout with Feeder
10—Sets Combustion Equipment including Burners, Blowers, Motors and Electrical Equipment.

THIS EQUIPMENT MUST BE SOLD IMMEDIATELY—REAL BARGAINS—

WHITEHEAD, SANGER & HOIDGE
36 WEST 40th STREET
NEW YORK, N. Y.

FOR SALE

Two (2) Monarch simplex rotary brass or aluminum furnaces available on skids for immediate shipment. 2000# capacity with new lining and blower for oil or gas $1475; 700# capacity (less blower) $450. Also a few other miscellaneous pieces of iron and aluminum foundry equipment for sale cheap. Address: Box 862, The FOUNDRY, Cleveland 13, Ohio.

For Sale

GOOD USED EQUIPMENT

Sly Dust Collecting System, consisting of 3 Sly #62 Dust Filters to handle 15,000 CFM each. Motors, 220/440 volt, 3 ph. 60 cycle. Was erected, but not used.

2—Chicago Pneumatic Air Compressors, 225 CFM, 100# pressure, two stage, single acting, air cooled with constant speed unloaders. Complete with motors and controls.

1—6-ton Northern 46' span, two motor, 230 volt Bridge Crane, Rope floor control.

Hassel Direct Safety Foundry Swing Grinder, Motor 230 volt DC.

10 HP. P&H Ball Bearing Crane Motor, 230 volts, 675 RPM.

60 HP Westinghouse Type SK, compound wound Motor, 230 volts DC. 680 RPM.

#1—Roots Cupola Blower, complete with 15 HP 220/3/60 motor.

#5—Roots Cupola Blower, complete with 30 HP 220/3/60 motor.

IRA C. JORDAN,
2508 E. BELLEVIEW PLACE,
MILWAUKEE 11, WISCONSIN

FOR SALE
JOLT STRIPPER MACHINES

1—Adams 10" x 32" Jolt Squeeze Stripper. Portable, new in 1946. Cost new $780.00. Our price $400.00.

1—Adams 12" x 38" Jolt Squeeze Stripper. Portable, new in 1946. Cost new $900.00. Our price $500.00.

Both of these machines are in excellent condition. Reason for selling, our contract for which these machines were purchased has been completed.

NOBLESVILLE CASTING COMPANY
NOBLESVILLE, INDIANA

FOR SALE

1—Schneible Multi Wash dust collector type J. C. capacity 8000 C.F.M.
1—Clarage No. 21 fan.
1—25 H.P. 3 phase 60 cycle motor—220/440 volts with sheaves and "V" belt drive.
1—Schneible 300 gal. twin dewatering tank.
1—Schneible No. 2—50 G.P.M.—35 Ft. Head, wear proof sludge pump mounted on cast iron frame, direct connected with a 2 H.P. Howell motor, 3 phase 60 cycle 220/440 volts.

All in good condition—less than five years old.

PELTON STEEL CASTING CO.
MILWAUKEE 7, WIS.

---

6 ton Capacity

HEROULT ELECTRIC FURNACE

Tilting type

1-6 ton shell—1-3 ton shell

Complete with all electrical controls.

IRON & STEEL PRODUCTS, INC.
43 years' experience
13444 S. Brainard Ave., Chicago 33, Illinois

"ANYTHING containing IRON or STEEL"

TURBO BLOWERS

2100 cfm @ 10 oz. Spencer, with 10 HP, 220/440 V, 3/60/3600 RPM motor.

(4) 675 cfm @ 6 oz., Spencer, driven by 2 HP, 220/440 V., 3 ph. 60 cycle 3600 RPM.

ALSO MANY PRESSURE BLOWERS NOT LISTED

HOISTS

¼ Ton—Detroit Titan—440/3/60
¼ Ton—Budgit—220/3/60
¼ Ton—Comet—440/3/60
¼ Ton—Shepard—220 D.C.
½ Ton—Chisholm Moore—440/3/60
½ Ton—Cleveland—440/3/60

THE MOTOR REPAIR & MFG. CO.
1552 HAMILTON AVENUE
CLEVELAND 14, OHIO

For Sale

FOR SALE

1 Fisher 4 burner gas fired Type SM 500 Serial No. 2517 Tilting with Spencer Turbo Blower and motor. This furnace also has 1 oil burner as auxiliary. Price complete..... $600.
1 Osborn #410-2 Jolt Rollover Molding machine with leveling device. Ser. No. 73201 30" long 16" wide. ..... $500.
2 Milwaukee Jolt Squeeze Molding machines #130, Table 15" by 18". Like new. Each $250
2 Bullseye Tilting wet mills, 18" wide at top 24" wide bottom 24" deep with motor. Each $325
1 No. 1 Demmler Core Blower Ser. No. 888. Like new $650
1 Royer Sand separator and blender Ser. No. 2902 Order 903 steel wheels. Excellent.. $350
2 Motorized Kane & Roach Wire straighteners, capacity wire ⅛" to ½". Excellent. Each $400
1 Complete Pangborn Sand Blast room, 13' by 13' by 10' with Dust Arrestor..... $2000

STEEL GAGGERS Plain or round steel ½", ⅝", ¾". Made to your order. Price $165 Net ton FOB Mill Eastern Penna.

We buy used Foundry Equipment.

Send for our new list No. 5 of Foundry Equipment in stock. Conveyors, Motors, Scales, etc., etc.

R. B. HARRISON
UNIVERSAL MACHINERY & EQUIPMENT CO.
320 EAST BROAD ST.
SHILLINGTON, READING, PA.

FOR SALE

1—Trent Electric Furnace with Brown Instruments, 3½ KW, 175 volts, 1 phase, 60 cycle, size MLR 4A, #60861.
1—Fisher 22" Tilting Furnace, take #275 crucible, equipped for gas firing.
1—Tilting Furnace, take #400 crucible, equipped for gas firing.
1—Eclipse Crucible Type Brass Melting Furnace, gas fired, catalog #200S.
1—Centrifugal Casting Machine and Motor, Centri-meco made, model SR-PR, serial No. 174.
1—Royer Shakeout Machine with Motor, 64" long x 52" wide, table 29" x 58".
1—Constant Heating Tank with motor and pump, with thermo controls.
1—Waage Air Pressure Wax Machine.
1—Osborn Rollover #203, take plates 36" x 50" with 8" draw, air clamps and air controlled table.

OLD COLONY FOUNDRY CO.
EAST BRIDGEWATER, MASS.

FOR SALE
PANGBORN SANDBLAST EQUIPMENT
ROTOBLAST TABLES—8 FOOT "LG-18" TABLES

Standard arrangement—8 Auxiliary Tables 28" diameter. Speed of Main Table 1 rev. 1 min. to 1 rev. in 4 min. Max. height to which Auxiliary Tables may be loaded—15". Maximum load on each auxiliary Table—200 lbs.
Ventilating Requirements—4000 C.F.M.
Maximum Abrasive Flow 28,000 pounds per hour.

COMPLETE WITH MOTORS, DUST COLLECTOR AND COMPONENT PARTS. PRACTICALLY NEW, WILL SACRIFICE FOR FRACTION OF ORIGINAL COST.

CMRCO CORPORATION
14111 SCHAEFER HWY, DETROIT 27, MICH.
TEL. VERMONT 76110-1

FOR SALE

Waite & Bartlett 220 volt—type 722—X-Ray machine with instruments and parts, housing and development room.

OLD COLONY FOUNDRY CO.
EAST BRIDGEWATER, MASS.

FOR SALE

Two—#942 and One—#1100 TORRINGTON SLAB MILLS.

AUSTIN D. LUCAS & COMPANY INC.
125 LINDLEY ST., BRIDGEPORT, CONN.

Classified Advertising

For Sale

FOR SALE

REBUILT EQUIPMENT

AIR COMPRESSORS
1—4½ x 4½ with Motor & Tank.
1—Ingersoll Rand No. 63832, Class E.R.-2. Air Cylinder 7 x 3½ x 5.

CORE OVENS, like new
1—Half Round with 5 shelves, 51" high, 54" wide, 27" deep.
We also make New Core Ovens, any style or type desired—Shelf, Pullout Drawer or Car Type.

FURNACES
3—Fisher Brass & Aluminum Furnaces, Type S, Complete with Burner, New Motor and Blower.

GRINDERS
3—Flexible Grinders, practically new.
(2—with 2 HP. Motor)
(1—with 1 HP. Motor)

INTERNATIONAL MACHINES
7—International J.D.P., Power Jolt, Power Lift.
2—International Hand Operated Rollover Machines, Table 17 x 22.

LADLES—WE MAKE NEW LADLES
1—8 Ton Worm Geared.
5—500 lb. Pouring Device Whiting Ladles, Cylinder Type.
1—1800 lb. Track Ladle, Worm Gear, Ball Bearing.

MIXERS
2—Blystone Mixers.
1—4 ft. Lancaster Mixer complete with loading bucket.
1—4 ft. Simpson Mixer with Speed Reducer and Motor.

OTHER JOLT SQUEEZER MACHINES
2—Milwaukee rebuilt Jolt Squeezers.
1—Rapid, Portable Jolt Squeezers. New—only used 2 weeks.

RIDDLES & RIDDLE BOTTOMS
20" Electric Riddle Bottoms
18" Hand Riddles, 5 Ply

ROLLOVER MACHINES
2—24G. Machines, Rollover.
1—"G" Rollover Machine 20 x 8.
1—Tabor Side Rollover Machine.

SAND BLAST BARRELS
2—No. 4 Tilting Type.

SAND BLAST CABINETS
1—Type K, 48" x 48" x 42" with Dust Arrestor, Practically New.

SAND CUTTERS
1—Model AA Gasoline Driven #68 Sand Cutter, Rebuilt throughout.
1—48" American Sand Cutter, Elec., Type AM.

LIST OF STEEL FLASKS

40 Sets—12 x 31—10 cope and 10 drag	Price per set	$14.00
50 Sets—11 x 41— 4 cope and 6 drag	Price per set	15.00
30 Sets—12 x 31— 7 cope and 7 drag	Price per set	16.00
30 Sets—18 x 19—4½ cope and 4½ drag	Price per set	11.00
40 Sets—18 Round—4 cope and 3 drag	Price per set	7.00
25 Sets—13 x 35— 6 cope and 6 drag	Price per set	15.00

SAND CONDITIONER
1—Royer Sand Conditioner

SCALES
1—Toledo Scale, new

SPRUE CUTTERS
1—Sprue Cutter with 2 HP motor

MISCELLANEOUS EQUIPMENT
Hand Trucks, #792 Fairbanks
3—Barrel Trucks, 2 Wheel, Rubber Tires
Pneumatic Tires, 600# capacity
1—Automatic Lift Truck & Charger
Lyon-Raymond Hyd. Lift Truck
2500# Cap. Model CW-11-54
Air Bench Rammers
Air Floor Rammers
Air Grinders Portable
Chipping Hammers

Vibrators
Branford Shakeout Vibrators

Assortment of New Emery Wheels
1—Scleroscope

High Speed Motors & Blowers for Brass Furnaces, several different sizes.
2000 ft. of new ⅝" Air Hose
1000 ft. of new ¾" Air Hose

Different Sizes of Roller Conveyor:
80 ft. of 19" wide, 1¾" dia. rolls 4" centers.
150 ft. of 16" wide, 3" dia. rolls—3 rolls to a ft.
70 ft. of 16" wide, 2" dia. rolls—4 rolls to a ft.

1—North American Cupola Blower with 15 H. Motor, direct drive.

HAYNES FOUNDRY EQUIPMENT CO.
814 ADA ST.
KALAMAZOO 52, MICH.

HARD IRON STARS

FOR SALE

IMMEDIATE DELIVERY

Prices on request

CROWN FOUNDRY CORP.
PHELPS, N. Y.

FOR SALE

1—International type F jolt rollover 32 x 52 table, jolt 2500 pounds, 16" draw with air flask clamps, rollers and air equalizers. New 1942. Address: DEZURIK SHOWER COMPANY, SARTELL, MINNESOTA.

FOR SALE

1—Pallet Conveyor, Jeffrey No. 24, 360 ft. of track, motors, 59 cars, elevation above floor 24", cars are spaced 72½", car tops are 48" wide x 60" long of ⅝" steel hydraulic rams pushes molds off conveyor to shake-out.

OLD COLONY FOUNDRY CO.
EAST BRIDGEWATER, MASS.

FOR SALE

1-Double drawer type foundry equipment company recirculating type gas fired core oven. Condition like new. Bargain. Address: Box 805, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Type AA Detroit Electric rocking furnace for ferrous alloys; 1000 lb. capacity, 200 V, 60 cycle, 2 phase, 4 wire. Complete with all electrical attachments. Has had light use. Available for inspection in Connecticut. Address: Box 839, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

1—SPO #2114-G portable jolt squeeze strip molding machine. Practically new. Address: KLUTTZ MACHINE & FOUNDRY CO., GASTONIA, N. C.

FOR SALE

New heavy duty motorized rod cutter, 65 cuts per minute; capacity: ¾ inch round hot rolled steel. Brand new. $890.00 f.o.b. Cleveland. Address: The Federal Foundry Supply Co., 4600 East 71st St., Cleveland 5, Ohio.

FOR SALE

Be independent of gas or oil shortages with a brass and bronze cupola melting furnace. We have one for sale complete with blower, gauges and smoke scrubber. Address: Box 864, The FOUNDRY, Cleveland 13, Ohio.

EQUIPMENT FOR SALE

MOLDING MACHINES
4—75J Osborn Jolt Squeeze
2—SPO #611-B Stationary Oscillating Squeeze Strippers
1—SPO #4½ JHS Air Jolt Hand Strip
2—Tabor Plain Squeeze, Strain Rod Type
3—Mumford 3" Cyl. Core Jolt, with 20" x 15" Table
1—Tabor Combination Jar Rollover Pattern Draw, 40" x 50" Table, 21" Draw. Capacity 2000 lbs.

BLOWERS FOR CUPOLAS AND FURNACES
1—16 x 24 HD Connersville 2500 CFM at 5 lbs.
6—#S05 General Blowers, 5 HP, 3/60/220, 1400 CFM at 8-oz. pressure
Maxon-Premix Blowers for Gas, ⅛ to 1 H.P.

METAL MELTING EQUIPMENT
1—Recirculating Gas Fired Oven with all controls, suitable for Core Oven
1—Style #600 Single Burner Tilting #150 Crucible Furnace for Gas, complete with lining and #7 Blower and Motor—220 Volt
2—Hausfeld 1000# Aluminum Capacity Furnaces, Barrel Type, Open Flame, Oil Fired
2—Hausfeld 2000# Aluminum Capacity Furnaces, Barrel Type, Open Flame, Oil Fired
1—Aluminum Electric Heat Treating Unit, 75 KW, 220 Volt, Batch Type, with Basket and Quench Tank
2—Hausfeld Open Flame Tilting Brass Furnaces, 400# Capacity, Gas or Oil
3—Stationary Gas Fired #60 Crucible Furnaces, with ¼ H.P. Maxon-Premix Blowers
2—Monarch-Rockwell Rotating, 500# Brass, Oil
1—60" Dia. Shell Cupola. One year old.
New 32" to 41" Dia. Shell Cupolas made to order

TUMBLING MILLS AND SAND BLAST
2—Pangborn #2 GH Barrels, Motor Drive, with Elevator and Pressure Tank, Complete
2—Pangborn #6 LE 6 ft. dia. Table, Syphon Feed, Motor Drive, with Dust Collector, Complete
1—Pangborn #2 Barrel, Suction Feed, Motor Drive, Complete
1—American Foundry Equipment Co. Stationary Cabinet Type Wheelabrator, complete with Elevator and all Motors

TUMBLING MILLS AND SAND BLAST
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1—Sand Blast Room, 10' x 10' x 6½'
4—New Haven 36" x 46" Self Contained Sand Blast Barrels, Belt Drive.
2—Pangborn Syphon Feed Sand Blast Cabinets
3—Portable Sand Blast Generator Tanks, 500# Sand Capacity
1—Battery of (4) 24 x 42 Tumbling Mills on Common Stands

1—Mono-Rail System Complete with approximately 1200 ft. of Track, 74—250# Capacity 110 Volt Hoist, two and four wheel trolleys, switches, and all necessary parts to install.

MISCELLANEOUS
1—(New) Type "D" #14 Roto-Clone Dust Collecting System, complete with Booth, Blower, 7½ HP Motor, Collecting Hopper and After Cleaner.
1—Model "M" Beardsley-Piper Screenerator, 3 H.P., 220 Volt, 3 Phase, on Rubber Tires
30—Jib Cranes, Floor Type, 1000 to 4000 lbs. capacity, 180° swing, 10 to 15 ft. arms
30—1000 lbs. Capacity Budget Electric Hoists
5—Sturtevant Dry Type Dust Collector Exhausters, 12500 CFM with 25 H.P. Motors
5—Low Lift Electric Trucks, 2000 lbs. capacity and up. Riding Operator Style
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6—Worm Geared Tilting Ingot Mold Stands, 6' to 12' Long
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PHONE PARKWAY 7812

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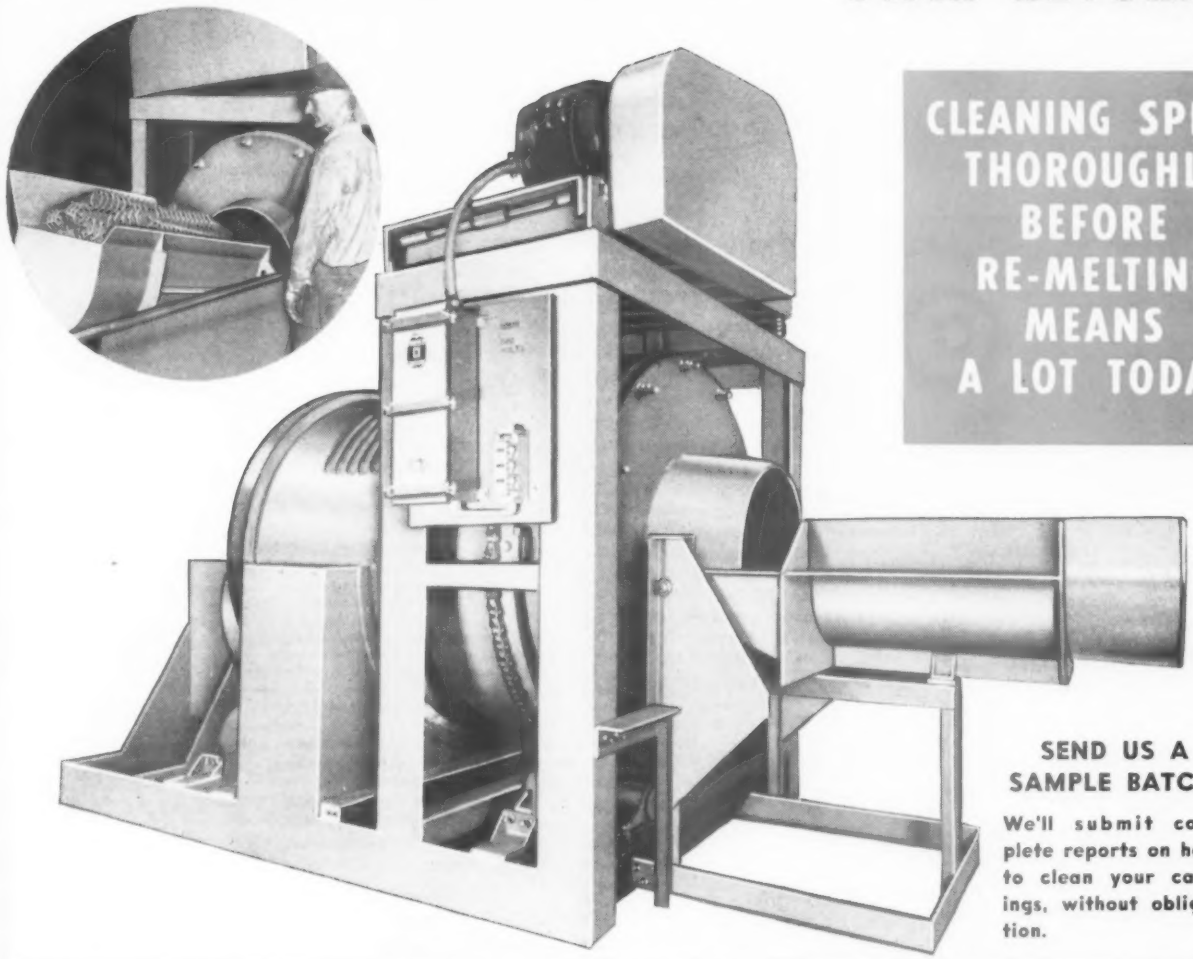

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We'll submit complete reports on how to clean your castings, without obligation.

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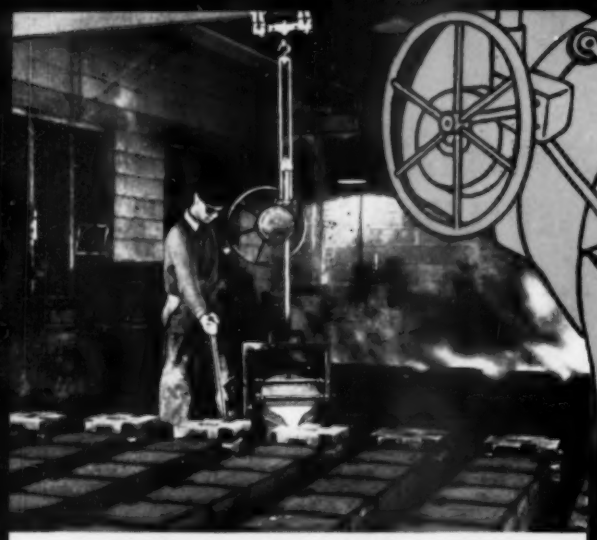
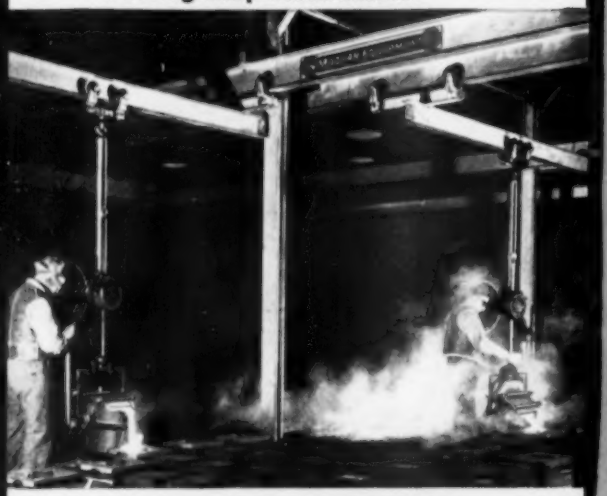
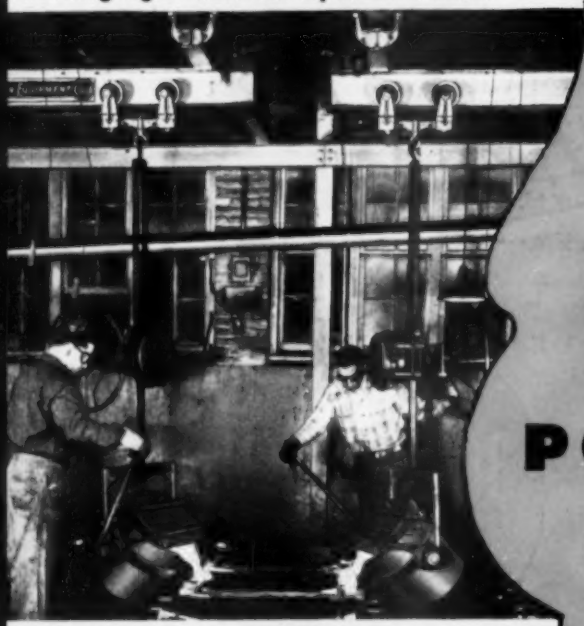


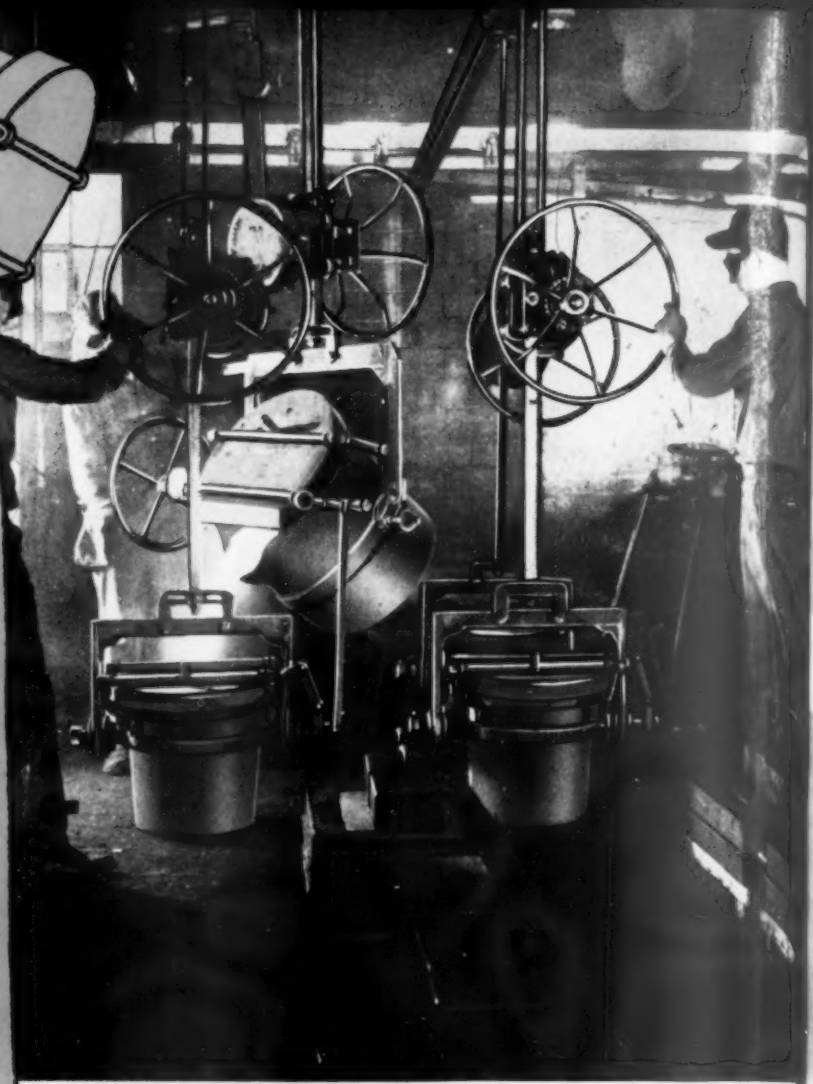
Pouring Snap-Flask Molds.



Pouring light work on Squeezer Floors.



wo-Up Pouring from adjacent cranes on indi-idual runways. Easy transfer from crane to rane, via stationary cross-over, provides full oor coverage . . . circumventing such obstacles s building columns.



Pouring Ladles receiving metal from a Distributing Ladle.

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. . . engineered for Full Floor Coverage coupled with High-Efficiency, Low-Cost Pouring . . . are delivering Top Performance in hundreds of top flight foundries. Write for Descriptive Bulletins 142, 143 and 143-B, or ask your MODERN Representative.

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Adaptable for use on cores for grey iron and Meehanite castings—including automotive cylinder blocks, elevating and conveying equipment, woodworking machinery, compressors, furnaces, and large jobbing castings.

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Carbon Blacking, a comparatively low-priced core wash, is in a class by itself, as it performs three distinct functions—can be used as a core wash; a mold wash for skin-dried molds, or a dry sand blacking.

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180-D CORE WASH

A high quality, graphite base core wash containing extra binder to prevent being washed off ahead of flowing metal, where a large volume of metal passes over the same coated area. Ideal for very large pit jobs.

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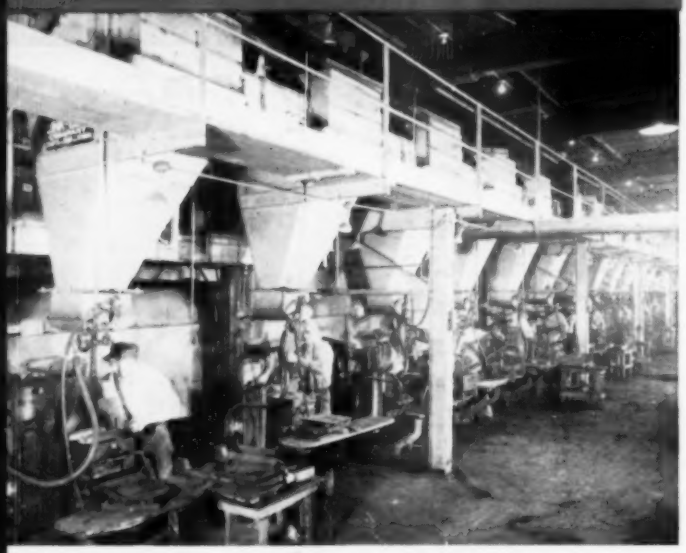
··the way to lower costs and the efficient use of workers' skill

Through mechanization, the foundry industry is fast becoming an ideal place to work. Foundries are replacing arduous, back-breaking tasks with smooth-flowing mechanisms that prepare sand, convey it to the molders' hoppers—move molds to the pouring zone—cool the molds through ventilated enclosures—shake out the molds—convey the castings and cores.

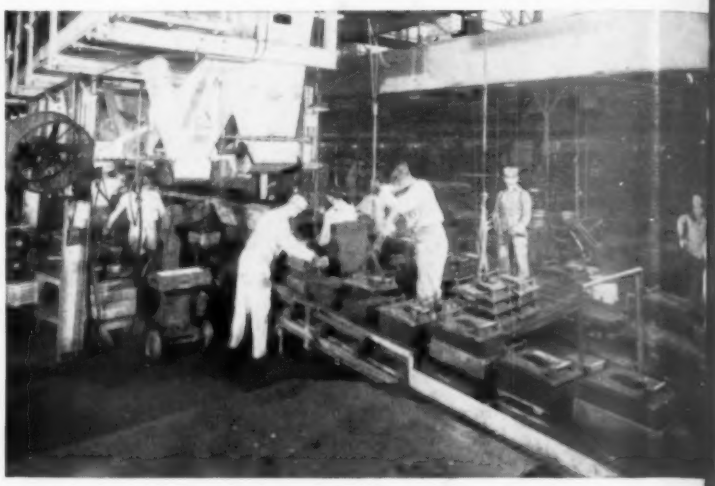
Continuous operations—clean, orderly, rapid and economical. Foundry men become craftsmen, as conveyors, screens, elevators take over the drudgery of foundry work. Labor supply increases—labor turnover decreases—schedules are met more surely at costs that are sharply competitive.

It may be worth your while to investigate the possibilities mechanization holds for you. A Link-Belt engineer will be pleased to discuss it with you.

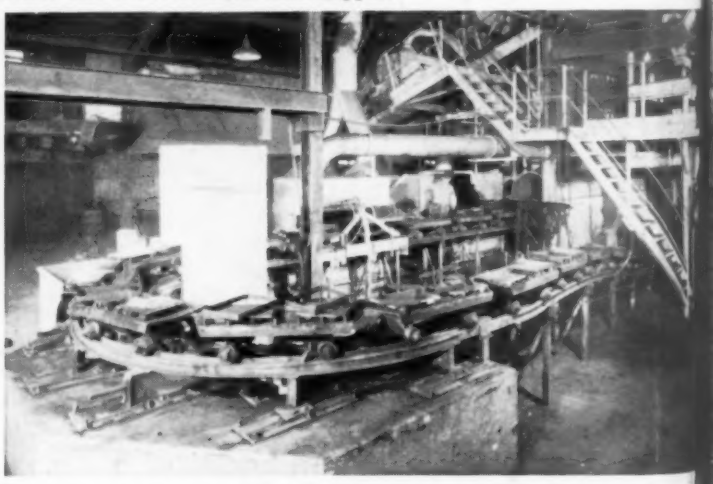


Line of 14 molding stations, at Sibley Machine and Foundry Corporation, South Bend, Ind., with overhead sand hoppers served by distributing belt conveyor. Attendant on footwalk along conveyor sets the discharge plows and sees that sand hoppers are kept filled.

Pouring zone of mold conveyor, showing three men pouring hot metal into molds which then pass through the ventilated enclosure around to other side of conveyor.



Mold conveyor is moving from molding stations at left through counting station (note seated attendant) and cast iron weight shifting station. Molder is placing a completed mold on conveyor, while man ahead has lifted a cast iron weight from section of gravity roll, with special mechanical tongs that eliminate lifting, and is placing it on top of mold nearest to him. The two men on other side of mold conveyor attend to removing weights and aluminum jackets. Photo also shows overflow sand hopper.



Take-up end of continuous mold-conveyor, looking toward two shakeout stations on far side of conveyor and toward sand revivifier (top, center). Note the automatic dumping cam arrangement at second shakeout. Observe also how the conveyor descends from shakeout level to the proper working level along the line of 14 molding stations at right.

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